*...or producers of Sand and Gravel, Crushed Stone, Cement, Lime, Gypsum, and other nonmetallic minerals*

SEPTEMBER 1957

# PIT and QUARRY

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Kaiser Chemicals Division's Seawater Magnesia Plant at Moss Landing, Calif. (See Page 128.)

# Over four years without overhaul using Cities Service C-300 Motor Oil!

When Northwest Sand and Gravel's pit of earth suddenly became a lake, it didn't drown out the company's operation or its spectacular performance results.

**WATER OR NO WATER,** Northwest continues to haul out 170 truckloads of gravel a day . . . and its crane continues to run without overhaul using Cities Service C-300 Motor Oil.

To date, the dragline has gone over four years without overhaul, and a front-end loader has chalked up three. Moreover, that's typical of the results Northwest has been getting with all its equipment, according to Supt. Alfred Karkut. He sums it up this way: "Since we've been using Cities Service products, we've had absolutely no trouble with any of our machinery. To me, there's no better testimony to a product than that."

Mr. Karkut puts it very simply. What more can be said about a lubricant except that it keeps machinery operating flawlessly? And what more can we say about Cities Service except to remind you to talk with a Cities Service Lubrication Engineer for similar performance? Call him in this week. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

**CITIES SERVICE**

**QUALITY PETROLEUM PRODUCTS**

"LARGEST FILL IN OHIO" is how C. F. REPLOGLE Construction Co., Circleville, Ohio, describes the 97-footer on its U.S. Route 40 relocation job. Other cuts and fills run between 80 and 90 feet – and up to 70% of the material is broken limestone and sandstone. This is tough on tires—but Goodyear Triple-Tough 3-T Nylon Cord TUBELESS tires take it even better than tube-type, cut earth-mover tire down time to new LOWS. Tubeless tires shown at work are (left to right) new wide-base Sure-Grip Lug, wide-base Hard Rock Lug and standard All-Weather.

## Up to 80% cut in earth-mover tire down time—

*plus many other advantages!*

Goodyear TUBELESS tires end tube and flap troubles—causes of as much as 80% of earth-mover tire down time. They also end costs of tube replacement and many-item inventories.

You save man-hours, too—for mounting is simple and emergency repairs may often be made *without removing tires at all!*

AND you save tires—for with Goodyear TUBELESS, small injuries usually show *before* they get serious.

Be sure *you* specify *Goodyear* TUBELESS tires on all new equipment—and see the *Goodyear* dealer for change-over of present vehicles. Goodyear, Truck Tire Dept., Akron 16, Ohio.

ON-JOB SERVICE BOON TO CONTRACTORS. Priceless time and valuable tires are saved by this fast and expert service. Strategically located Goodyear shops and field crews are convenient to jobs almost anywhere.

Buy and Specify **GOODYEAR**

**MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND**

All-Weather, Road Lug, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR TIRES

*Look for this nearby Goodyear dealer sign for better tire values —better tire care.*

**Now Tubeless or Tube-Type with Triple-Tough 3-T Nylon Cord**

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# pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

**SEPTEMBER 1957 Vol. 50 No. 3**


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NBP EPA


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## *Cover Picture*

• Expansion of the seawater magnesia plant distinctively pictured on the cover of this issue has provided an increase of more than 50 percent in the periclase production capacity of this facility. Operated by Kaiser Chemicals Division of Kaiser Aluminum and Chemical Corporation, Oakland, Calif., the plant can now handle twice the volume of seawater. Among the items incorporated in the expansion are a new kiln, treatment and settling tanks, and material-handling equipment. The firm's $3,000,000 program also comprehended additions to the basic refractories plant at Columbiana, Ohio.


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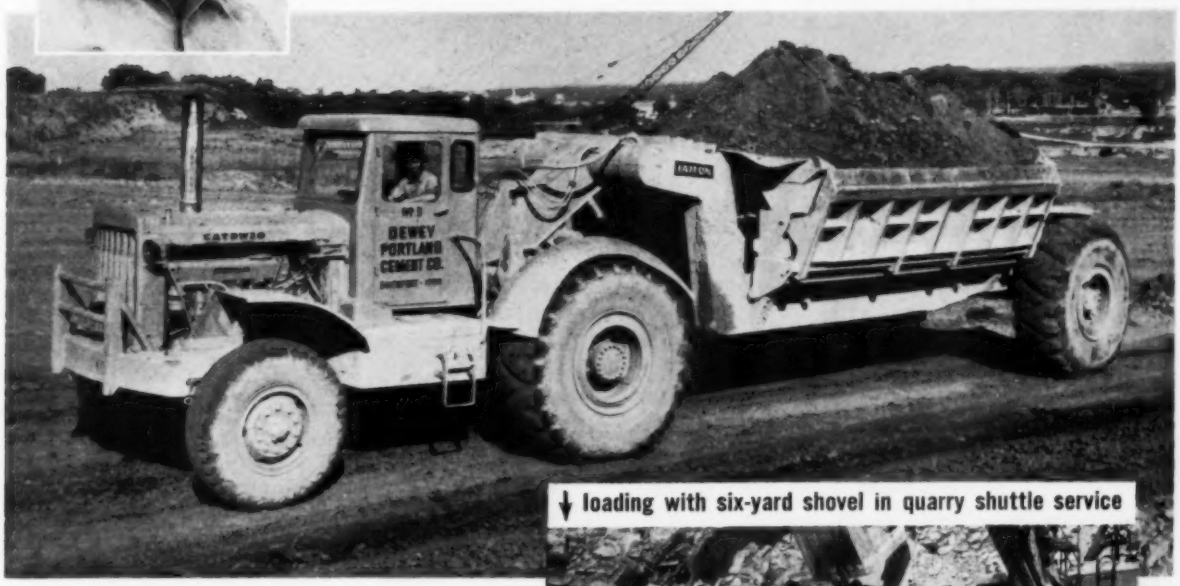
*To subscribers: When requesting change of address, kindly send old as well as new address.*

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

# "TREMENDOUS load carrying ability!"

says N. D. ARMENTROUT, Quarry Superintendent, Dewey Portland Cement Co., Davenport, Iowa



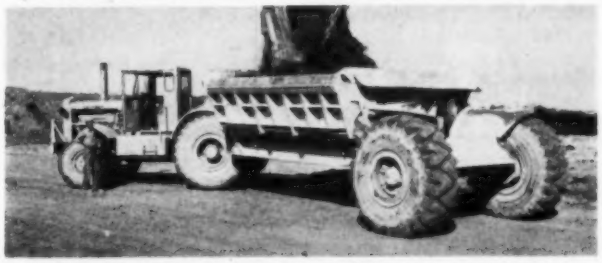

"Three units work sixteen hours a day. *Eight hours hauling rock in the quarry. Eight hours stripping overburden.* All we do is change drivers.

"Tremendous load carrying ability in quarry hauling and in stripping. Have handled 39 tons without difficulty. Average payload 30-34 tons.

"Four years in brutal daily service and never a breakdown. 50% increase in quarry production to 4,500 tons per day. One full eight-hour shift eliminated."

↓ loading with six-yard shovel in quarry shuttle service

↓ loading with dragline bucket in stripping operation



↓ driver has safe view of dumping over bank in fill area

**EASTON**

**TD-1832H HYDRAULIC SIDE DUMP**

*gooseneck trailer • fully automatic drop door*

**Easton Car & Construction Company • Easton, Pa.**

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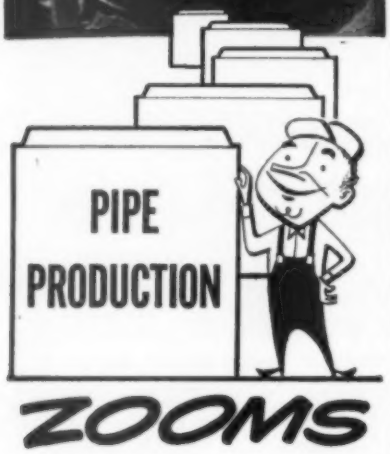


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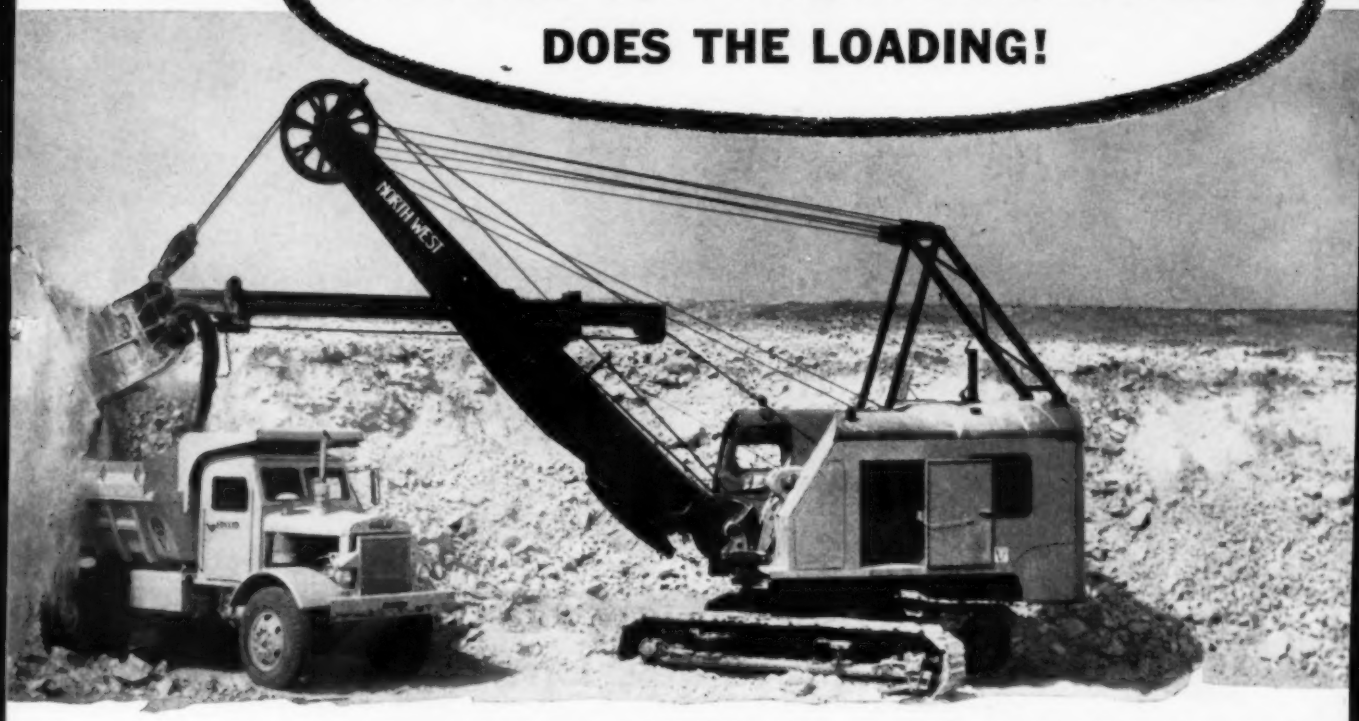
# IT'S A HIGH OUTPUT CRUSHING JOB WHEN A *NORTHWEST* DOES THE LOADING!




This big Northwest 80-D, 2½ yd. Shovel is loading trucks to feed a Cedarapids Crushing plant. It is loading caliche for Henry L. Stafford of Lubbock, Texas, and the combination of high performance and ideal conditions is producing phenominal output.

Phenominal output is always dependent on conditions and Northwests are built to meet conditions as you find them. Northwests are rock shovels, built to handle the toughest kind of jobs — built to assure the highest output that conditions permit.

Northwests have that desirable characteristic of always being ready to go. Get up on a Northwest sometime if you know operation. Get the feel of the controls yourself. Feel that crowd take a-hold. The dipper goes right on through as the hoist takes it up — no "re-starts" are required here. It's a full load in one cut. Remember the Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste — force that puts greater effectiveness at the dipper lip for handling tougher digging and producing more output. To Northwest digging power add the "Feather-Touch" Clutch Control which brings ease of operation without the complications of pumps, piping and compressors; the Cushion Clutch that eliminates shovel overloads before the damage is done; Uniform Pressure Swing Clutches that cut spotting time by eliminating the jerks and grabs in swinging; Northwest simplicity of design that makes upkeep easy and reduces "down time"; and all other Northwest advantages that make Northwest a *real* Rock Shovel.

You can plan to have a Northwest. Now is the time to find out about Northwest design and operation. Why not talk it over with a Northwest Man?

**Perhaps Rubber Tired Equipment will do your job better. The Northwest Truck Crane brings you a combination of advantages found in no other similar machine. Get the full story before you buy.**

SRO-38-SG

**NORTHWEST ENGINEERING COMPANY**
**135 South LaSalle Street, Chicago 3, Illinois**

# NORTHWEST

**SHOVELS • CRANES • DRAGLINES • PULLSHOVELS**

*Convertible for any Mining Material Handling or Excavation Problem*

# A new **JEFFREY CHAIN** for a new **Lima** Shovel

INTRODUCED at the 1957 Road Show, this Baldwin-Lima-Hamilton 3-yard shovel got lots of well-earned attention. It's a husky giant with many unusual features. For example, it can be knocked down into units of less than 60,000 pounds for easy haulage.

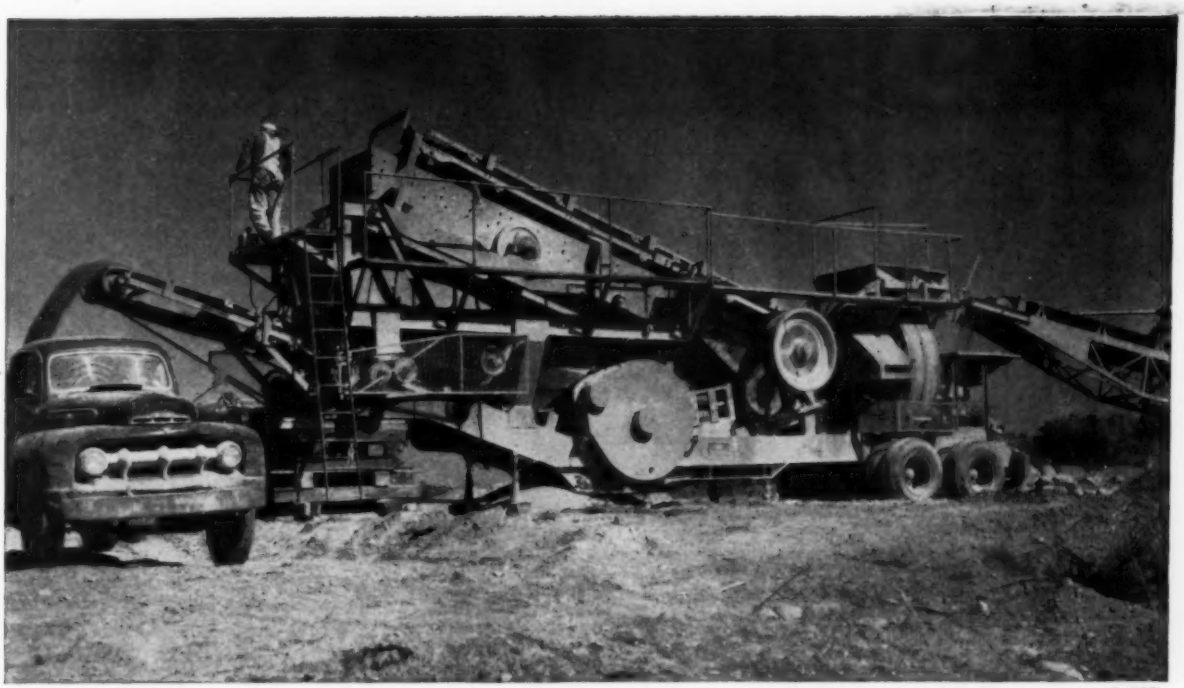
Less unusual is the fact that the main drive is through Jeffrey chain. A new design, to be sure, to suit the needs of this new shovel, but Jeffrey chain is standard on many Lima crawler drives—proved dependable for this gruelling, demanding service.

Jeffrey makes chain, attachments, sprockets and accessories in types and sizes to meet every service requirement—for power transmission and conveying. Standard components are carried in stock for your convenience at handy locations. The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

It takes husky chain to transmit the horsepower for this shovel's main drive.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT . . . TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING



D-457

## *Production at a profit . . . wherever you use it*

# DIAMOND 77 PORTABLE CRUSHING and SCREENING PLANT

Here are the cost-cutting, production-boosting advantages that put Diamond way out in front:

- ★ **Big, powerful crushing capacity with a 10″ x 36″ jaw crusher and a 36″ x 22″ star gear roll crusher.**
- ★ **Speedy separation of material on a 4′ x 12′, 2½ deck vibrating screen.**
- ★ **30″ wide belt conveyors.**
- ★ **The Diamond "line-flo" rotor-lift principle that guarantees fast, continuous movement of aggregate.**

You get all these in a Diamond plus complete portability . . . a hydraulic mechanism to lower the screen deck to travel position . . . and rugged Diamond construction throughout for practically any type of crushing operation. No wonder reports from the field read like these:

"300 to 400 tons per hour of road gravel in 25% to 35% crush" . . . "less down time, more production" . . . "oversize roll crusher and screens do the trick" . . . "smoothest operating plant we have seen".

And remember . . . Diamond gives you a choice of drives. Mechanical drive with one power unit is standard. Optional drive: (1) one power unit to drive crushers with electric motors to drive screens, rotor-lift and conveyor, and (2) same as No. 1 except for motorized head pulleys on all conveyors.

*For complete details, see your Diamond distributor.*

**DIAMOND IRON WORKS**
*division*
**GOODMAN MANUFACTURING COMPANY**
**Halsted Street and 48th Place • Chicago 9, Illinois**

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**Everything For The Aggregate Producer**

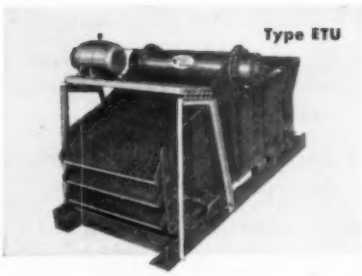
Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants For Rock and Gravel

. . . says Paul Robinson of J. W. Robinson & Son, a sand and gravel plant in Auburn, New York. "We've got two Deister Screens now; a single-deck 3 x 6 that's been operating steadily since 1942, and a four-deck 3 x 6 that was installed in 1955, to replace another manufacturer's screen that required eight sets of bearings in seven years. The Deisters have been giving us good steady operation with little or no maintenance."

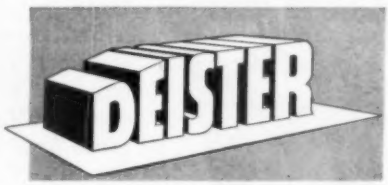
J. W. Robinson, who has been in the crushed stone and sand business since 1920 says, "Deister is the best screen I ever saw in operation. That's why we're going to buy another one to increase our plant production."

Paul Robinson lists the main advantages of the Deister ETU Screens as . . . "very little vibration transferred to the plant, no blinding, and the two-bearing unit, which carries no weight from the screen and takes high speed operation with no difficulty."

But these are just a few of the profit-making features built into Deister Vibrating Screens. Only on Deister Screens can you get such *exclusive* features as Unitized Life-time Vibrating Mechanism with oil bath operation, and the Deister Opposed Elliptical Throw. To *get* maximum production to rigid specifications . . . and to *get* maximum protection against downtime . . . *get* Deister.

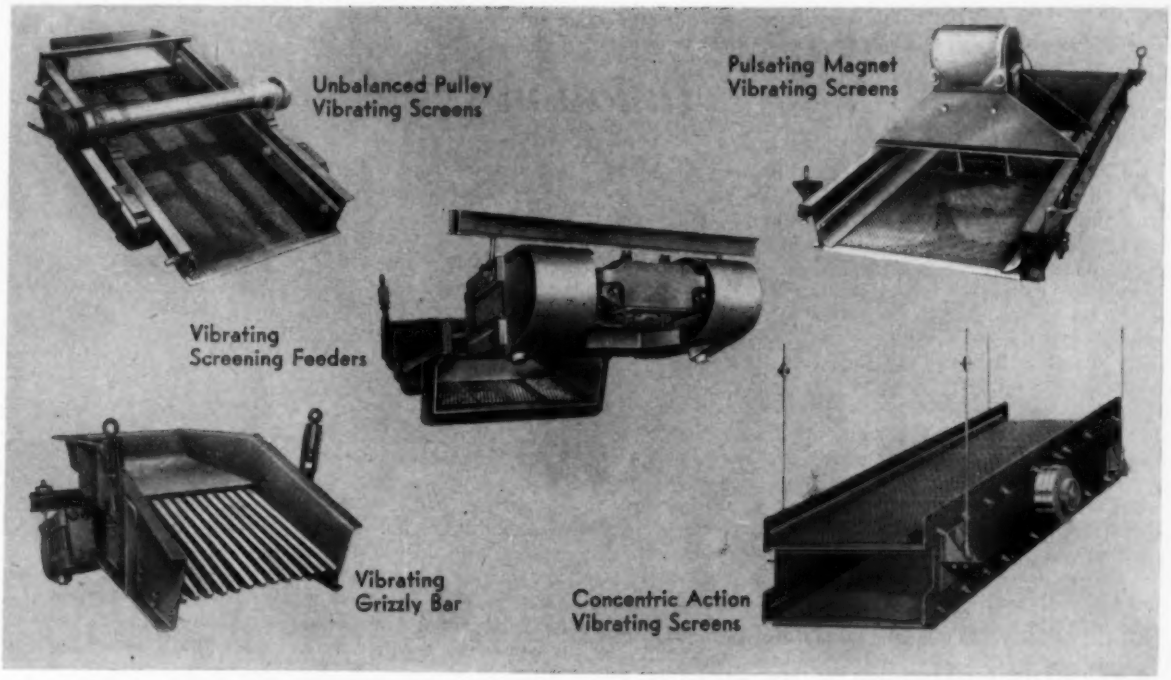



The two end-tension screens above, like other Deister models, feature opposed elliptical throw, low screening angle, cushioned vibration, and automatic screen cloth tension . . . features that mean better operating performance for you.




**DEISTER MACHINE COMPANY**
**1933 East Wayne Street, Fort Wayne 4, Ind.**

# Higher Tonnages . . . at Lower Cost




## SYNTRON

# VIBRATING SCREENS

**5 different types of screens—one for every screening problem**

## EFFICIENT SIZING AND SEPARATING OF SAND, GRAVEL AND ROCK . . .

SYNTRON now offers a complete line of screening equipment to the non-metallic minerals industry. SYNTRON Vibrating Screens are designed and built for long dependable service and combine high capacity output with low operating and maintenance cost—plus quality control of material.

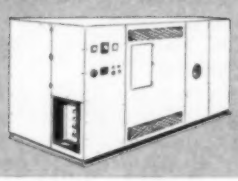
SYNTRON Vibrating Screens are backed by more than a quarter-century of experience in the materials handling field.

SYNTRON'S years of experience are available to you, send details of your screening problem to our application engineers for recommendations.

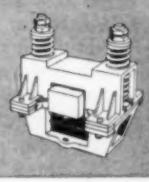
**Builders of quality equipment for more than a Quarter-Century.**

**Other SYNTRON Equipment of proven Dependable Quality**

**AC TO DC POWER CONVERSION UNITS**

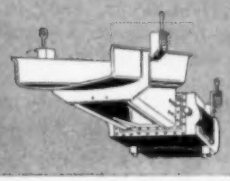


**BIN VIBRATORS**



**GASOLINE HAMMER ROCK DRILLS**

**VIBRATORY FEEDERS**



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385 Carson Avenue Homer City, Penna.

# The Editor's Page

## *Inflation*

APPARENTLY inflation is something we all should begin to worry about again. After the runaway inflation which reduced the value of our dollar from 100 cents in 1939 to 52 cents in 1952, or an average of about 3.7 cents annually, we were lulled into a sense of false security by the comparative stability which has since existed. By 1956 the dollar dropped only 0.9 cents more in value to 51.1 cents, or about 0.2 cents per year. As a result, the recent disclosure of the drop to 49.4 cents in 1957, or 1.7 cents in one year, has caused a great deal of consternation and speculation. This drop of 3.4 percent resulted from an increase in the cost of living which brought that index to the highest level in history. The consumers price index also shows that prices have been rising every month for the last 10 months. The prospects are for a continued and even more rapid inflation because of the current wage-price spiral. And this is taking place in spite of government controls which are supposed to prevent inflation.

ACCORDING to some of the best authorities, our economy today has a number of built-in stabilizers which will prevent any recession, dip, or other economic ailment from being transformed into a serious depression. We did not have these stabilizers in the early 1930's but they showed their effectiveness in helping to prevent the dip in 1949 from becoming serious. Among these stablizers are the following: the farm price support program; the unemployment compensation system; the numerous private and public pension programs, including Social Security; and the Federal Deposit Insurance System.

These factors, it is felt, with the population growth, new technology and new products backed by a sound but flexible monetary and fiscal policy, will bring us to new heights of prosperity. But will they also insure and perpetuate a planned slow inflation?

WE have had inflation ever since the big depression; except for a few minor dips, prices, wages, and the cost of living have gone up erratically but continuously for 27 years. With the existing "planned slow" inflation it is becoming more and more obvious that old-fashioned thrift and savings methods are outmoded. Those who have profited most from inflation are the ones who got on the bandwagon early, buying homes, real estate, businesses, etc., on long-term credit, paying for them with easier depreciated dollars. With controlled slow inflation guaranteed, this type of operation based on credit can become the accepted way of life.

Inflation is profitable to some but it causes suffering and privation to many others who are no longer in a position to improve their financial condition. Wage increases for industrial workers and salaries of others have, by and large, kept up with rising costs. Many union workers get automatic or escalator wage increases based on living costs and many also are guaranteed future increases in their contracts with employers.

The ones who suffer from inflation fall into three groups: the consumer, including the families of the men and women who receive higher wages; the small-business man, the little manufacturer, and the independent store owner who can't meet the rising costs and make a reasonable profit; and above all, the men and women, usually past the age when they can work and earn, who must live on fixed incomes, including their savings, pensions, and Social Security. The dollar they get today will buy less than half of what it would in 1939, and few get enough more dollars to compensate.

WHAT most people do not realize is that government, especially the Federal Government, is by far the biggest profiteer from inflation. The more we earn, the more tax we have to pay. But the increase in taxes is not in direct proportion to the increase in income. The tax rates are based on dollars, regardless of value. There is little to complain about when increases in real income boost one into a higher tax bracket; but when this is caused by inflationary increases, that's something else again.

There is much crying among businessmen about the present tight credit situation. They do not realize that, bitter as it may seem, it is the medicine we must take if we want to insure ourselves against runaway inflation. Complex economic matters are difficult to express in simple terms but one expert does it well. He says we must understand that during most of the postwar period, capital expenditure for industrial expansion, home building, and other purposes have run ahead of national savings. The difference was supplied by the credit of the banking system, and only by tightening that credit can our economy be brought back in balance. A tight money policy raises interest rates, discouraging capital expenditures and encouraging savings, and apparently only in this way can inflation be controlled. It is now evident that such steps should have been taken two years ago, when inflationary pressures began to develop.

THERE is some feeling that the bankers are profiteering from the higher interest rates. Actually, the public is the chief beneficiary, as the interest paid out by leading institutions to millions of depositors has increased at a much faster rate than interest received by the institutions on loans. It should also be borne in mind that interest rates are not really high. The rates on commercial paper have been averaging 4 percent in contrast with the 6 percent average of 1929 and the still higher averages of the preceding years. Also, United States rates are low in comparison to those of other countries.

The present administration deserves our thanks for its efforts to combat inflation to date. It should be encouraged to take any additional necessary measures.

Walter E. Trautfeller

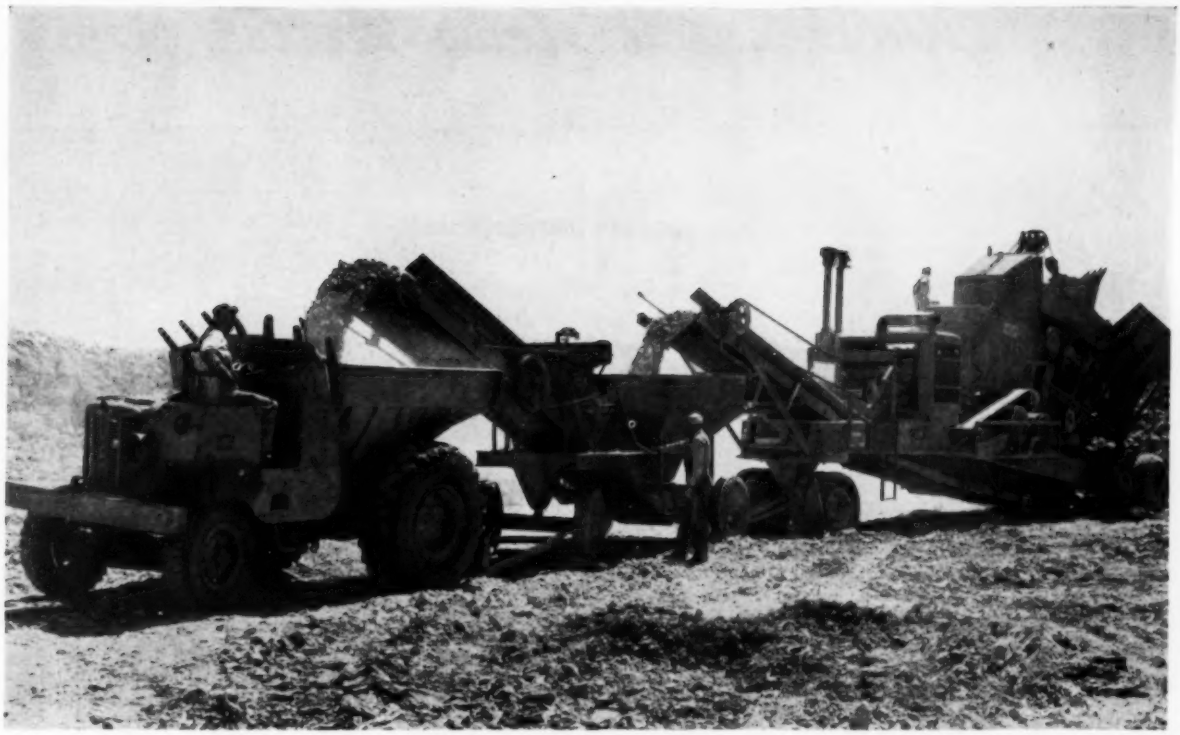


Photo Courtesy Iowa Mfg. Co.

# Keep engine efficiency up, COSTS DOWN

**GET MORE WORK** from your engines and spend less for their upkeep. Use the lubricant that gives extra protection—*Texaco Ursa Oil Heavy Duty.*

*Texaco Ursa Oil Heavy Duty* is especially made to assure ideal engine lubrication and cleanliness. It is carefully refined and de-waxed, then fortified with effective additives that step up the ability of this great oil to—

1. **Inhibit oxidation**
2. **Assure full detergency and dispersion**
3. **Prevent rust**
4. **Protect bearings**
5. **Withstand high pressure and temperature**
6. **Minimize wear**

*Texaco Ursa Oil Heavy Duty* is one of the complete line of *Texaco Ursa Oils*—all designed to make diesel and heavy duty gasoline engines deliver *more power* with *less fuel* over *longer periods* between overhauls.

For your air compressors, use *Texaco Regal Oil R&O.* It keeps systems clean, lines clear—assures dependable performance.

For wire rope and open gears, use *Texaco Crater* or *Texaco Crater X Fluid.* You'll keep rope strong longer, get better performance from your gears.

A Texaco Lubrication Engineer will gladly help you simplify and improve your lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

**TEXACO Lubricants and Fuels**

**FOR ALL CONTRACTORS' EQUIPMENT**

# Washington News Letter

WHILE most of Washington stews in the summer heat over the issues of civil rights, creeping inflation, and high interest rates, a few analysts spend all of their time making long-run measurements of the economy. They are found in the National Income Division of Department of Commerce. While their annual reports on such matters as the gross national product and the national income are rarely newspaper headline material, the story told by their figures may, in the long run, be more fundamental than front-page stories.

The analysts have just completed toting-up the results for 1956, which shows another rise to an all-time high. This has been the story almost every year since the lowest point of the Great Depression in 1933. The figures for the gross national product (which is the current value of all the goods and services produced in the period) are shown, for every year since 1929, in the second column of the following table:

**Gross National Product**

| Year | In Current Dollars (Billions) | In Constant 1947 Dollars (Billions) | Population (millions) | Per Capita in Constant 1947 Dollars |
|---|---|---|---|---|
| 1929 | $104.4 | $149.3 | 121.9 | $1,225 |
| 1930 | 91.1 | 135.2 | 123.2 | 1,097 |
| 1931 | 76.3 | 126.6 | 124.1 | 1,019 |
| 1932 | 58.5 | 107.6 | 124.9 | 861 |
| 1933 | 56.0 | 103.7 | 125.7 | 825 |
| 1934 | 65.0 | 113.4 | 126.5 | 897 |
| 1935 | 72.5 | 127.8 | 127.4 | 1,003 |
| 1936 | 82.7 | 142.5 | 128.1 | 1,112 |
| 1937 | 90.8 | 153.5 | 129.0 | 1,190 |
| 1938 | 85.2 | 145.9 | 130.0 | 1,112 |
| 1939 | 91.1 | 157.5 | 131.0 | 1,202 |
| 1940 | 100.6 | 171.6 | 132.2 | 1,298 |
| 1941 | 125.8 | 198.2 | 133.4 | 1,486 |
| 1942 | 159.1 | 223.6 | 134.9 | 1,658 |
| 1943 | 192.5 | 248.9 | 136.8 | 1,819 |
| 1944 | 211.4 | 268.2 | 138.4 | 1,938 |
| 1945 | 213.6 | 263.1 | 139.9 | 1,881 |
| 1946 | 209.3 | 233.8 | 141.4 | 1,653 |
| 1947 | 232.2 | 232.2 | 144.4 | 1,611 |
| 1948 | 257.3 | 243.9 | 146.6 | 1,664 |
| 1949 | 257.3 | 241.5 | 149.2 | 1,619 |
| 1950 | 285.1 | 264.7 | 151.7 | 1,745 |
| 1951 | 328.3 | 282.9 | 154.4 | 1,832 |
| 1952 | 345.5 | 293.7 | 157.0 | 1,871 |
| 1953 | 363.2 | 305.3 | 159.6 | 1,913 |
| 1954 | 361.2 | 301.3 | 162.4 | 1,855 |
| 1955 | 391.7 | 322.8 | 165.3 | 1,953 |
| 1956 | 411.7 | 332.0 | 168.1 | 1,976 |

**By S. HERBERT UNTERBERGER**

From these data, it looks as though the volume of goods and services produced in 1956 is almost four times that of the very prosperous year of 1929, over seven times the depression year of 1933, and almost twice the post World War II year of 1946. This seems a bit extreme, and a little reflection will suggest promptly some of the reasons for this strange situation.

The most important is that 1956 dollars are quite different from 1933 and even from 1929 and 1946 dollars. Thus, merely stating the national product or the national income in terms of current dollars can often result in misleading conclusions. For example the 5 percent increase between 1955 and 1956 clearly amounts to much less, when consideration is given to the fact that prices rose by an average of 3½ percent during that period.

To avoid the difficulty inherent in the use of these unrefined data, the Commerce Department prepares an additional series showing the gross national product in dollars of constant, rather than changing, value. For purposes of convenience, they express these data in 1947 dollars. The figures in constant 1947 dollars are shown on the next column of the above table.

Rather than a fourfold increase between 1929 and 1956, these data show a little more than a doubling in the value of goods and services produced, a little more than a tripling since 1933, and just about 50 percent increase since 1946. These data in constant dollars can also be regarded as reflecting the changes in the volume of goods and services produced, as well as in their value.

But even this is not enough to tell the whole story. Over this more than quarter of a century the number of people who must be supported by this output has increased substantially. As seen in the next column on the table, the population has risen from 122,000,000 in 1929 to 168,000,000 in 1956.

With this information available, it is possible to calculate the *per capita* gross national product, which is shown in the final column of the first table. These are especially significant figures since they show generally how much was produced, on the average, for each individual. From this it may be seen that there was a drop of 30 percent between 1929 and 1933 and then a rise to a peak in 1944, a decline, and then a rise to an even higher level in 1955 and 1956.

**Personal Consumption Expenditure**

| Year | In Current Dollars (Billions) | In Constant 1947 Dollars (Billions) | Per Capita in Constant 1947 Dollars |
|---|---|---|---|
| 1929 | $ 79.0 | $107.3 | $ 880 |
| 1930 | 71.0 | 100.9 | 819 |
| 1931 | 61.3 | 98.0 | 790 |
| 1932 | 49.3 | 88.9 | 712 |
| 1933 | 46.4 | 86.6 | 689 |
| 1934 | 51.9 | 91.5 | 723 |
| 1935 | 56.3 | 97.3 | 764 |
| 1936 | 62.6 | 107.6 | 840 |
| 1937 | 67.3 | 111.5 | 864 |
| 1938 | 66.6 | 109.8 | 845 |
| 1939 | 67.6 | 116.3 | 888 |
| 1940 | 71.4 | 122.5 | 927 |
| 1941 | 81.9 | 130.9 | 981 |
| 1942 | 89.8 | 128.1 | 950 |
| 1943 | 100.5 | 131.4 | 961 |
| 1944 | 109.8 | 135.9 | 982 |
| 1945 | 121.7 | 145.2 | 1,038 |
| 1946 | 146.6 | 162.4 | 1,149 |
| 1947 | 165.0 | 165.0 | 1,145 |
| 1948 | 177.6 | 168.0 | 1,146 |
| 1949 | 180.6 | 172.3 | 1,155 |
| 1950 | 194.0 | 182.8 | 1,205 |
| 1951 | 208.3 | 183.6 | 1,189 |
| 1952 | 218.3 | 189.3 | 1,206 |
| 1953 | 230.5 | 197.4 | 1,237 |
| 1954 | 236.6 | 200.9 | 1,237 |
| 1955 | 254.4 | 215.4 | 1,303 |
| 1956 | 267.2 | 222.5 | 1,324 |

The 1944 peak however, was primarily war material, which was not really available in any direct sense to the population. Similarly, since then a significant proportion of the output is composed of articles of defense which, while important to the population, is not directly available for their consumption.

For this reason, a companion set of data is often considered, namely the data on personal consumption expenditures in current dollars, in constant dollars, and per capita in constant dollars. These are shown on the second table.

These data show most of the same ups and downs as the gross national

(*Continued on page* 128.)

## Convert Unsuitable Materials into

# Specification Sand

BY processing rock, coarse aggregate, and unusable natural sand, the Allis-Chalmers rod mill gives you specification sand *where and when you want it*. It extends the life of natural deposits. It eliminates the expense and inconvenience of distant shipments.

### Specification Flexibility

Meeting varying specifications with an Allis-Chalmers rod mill is merely a matter of changing feed, feed-water rate, or rod charge. Once mill is adjusted to produce a required product, it needs very little attention.

### Cubical Product

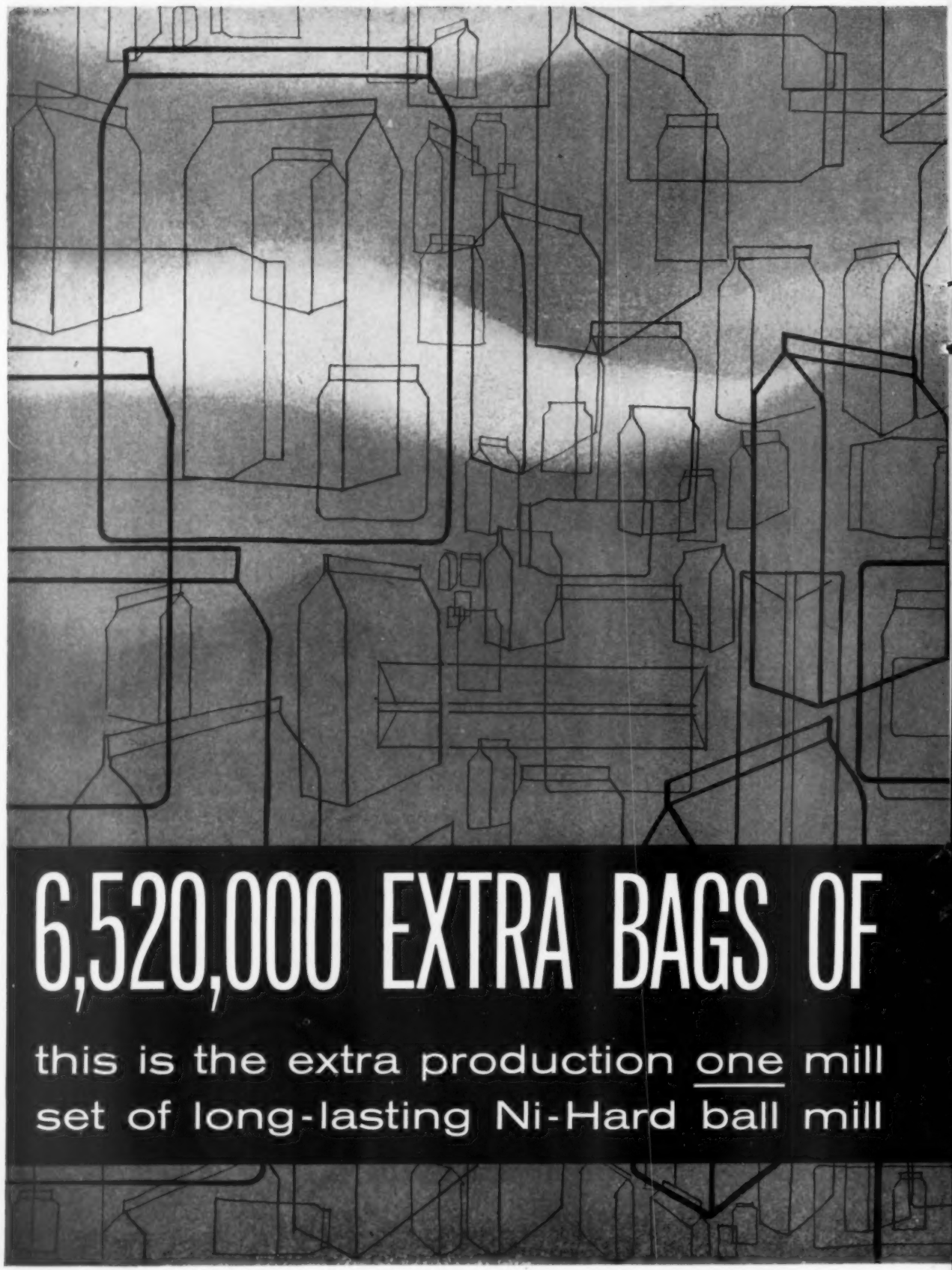
Rod mill action breaks long, flat particles . . . knocks corners off rough pieces, yet does not produce an excessively smooth particle. Size distribution is excellent. Product is ideal for use in concrete.

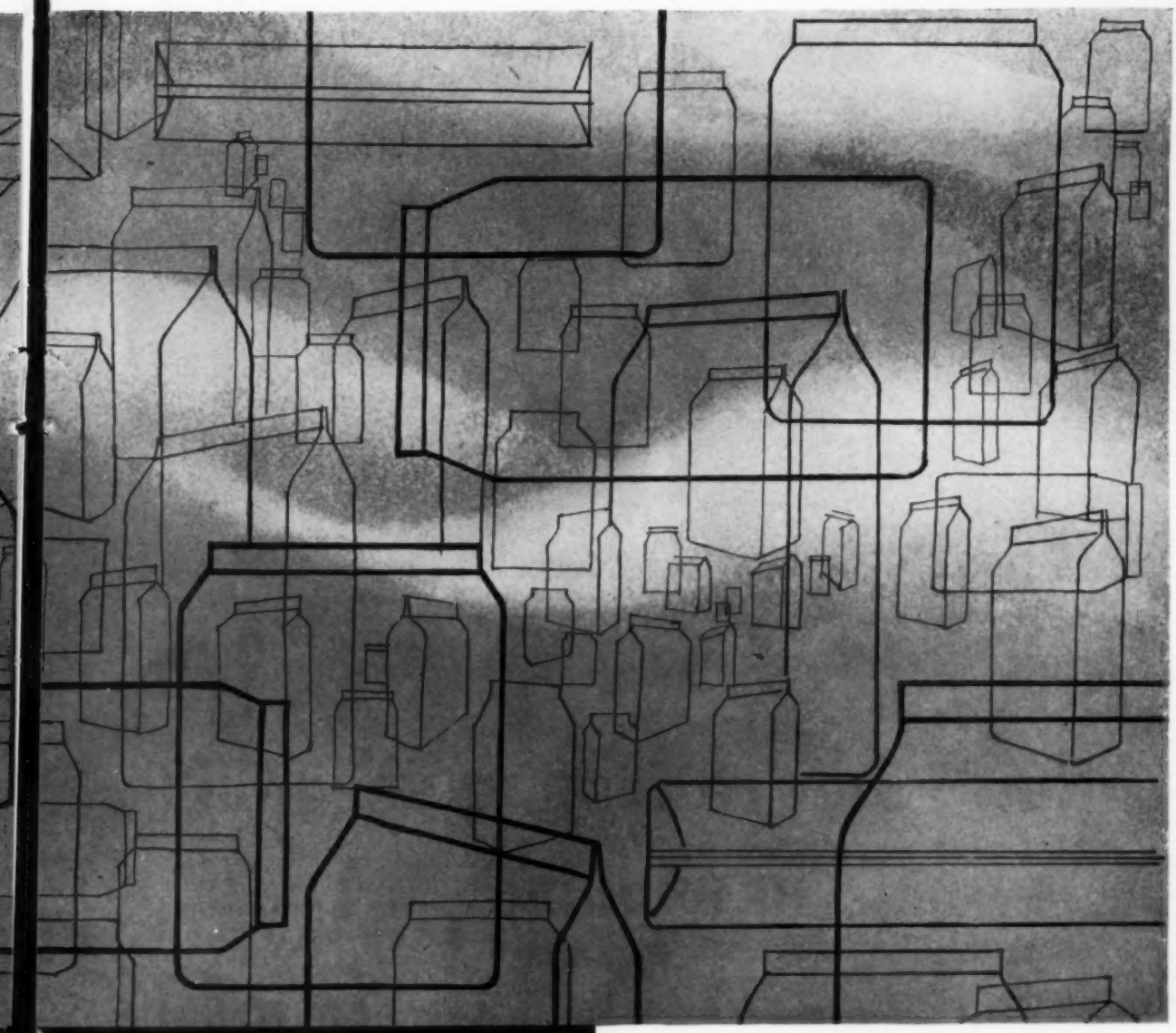
"Manufacturing" sand is a particularly tough, abrasive operation. That's why you'll want the Allis-Chalmers rod mill. It's a rugged machine that has proven most economical for grinding sand — in terms of long life and low operating costs.

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis. Ask for Bulletin 07B6718A.

**ALLIS-CHALMERS**

A-5311


6,520,000 EXTRA BAGS OF
this is the extra production one mill
set of long-lasting Ni-Hard ball mill



# CEMENT...

## got from one liner segments

Over six and a half million *extra* bags from one liner set!*

Big barrel bonuses like this are typical in cement plants that put in Ni-Hard† ball mill liner segments.

When grinding raw stone and clinker, field tests show, Ni-Hard liners in the mill usually outwear chilled white iron by 100-200% . . . various steels by 50-100%. Sometimes, as in this case, they do even better.

Getting a list of authorized producers of Ni-Hard mill liners is easy. Just write Inco.

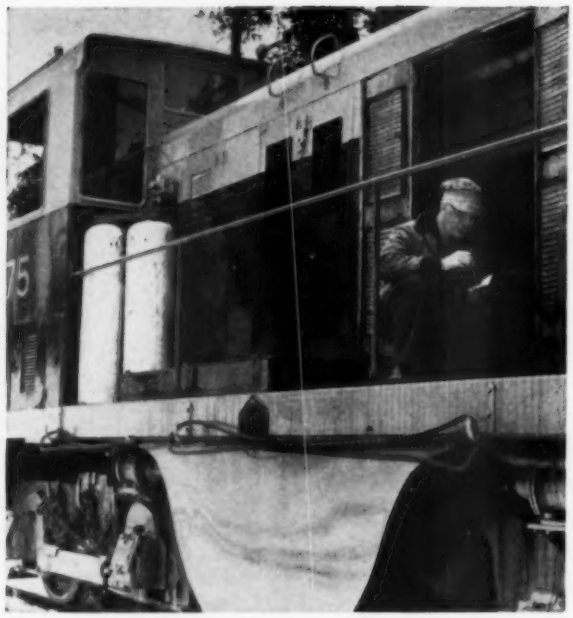
*Plant name and details on request †Registered trademark

**The International Nickel Company, Inc.**

67 Wall Street INCO New York 5, N. Y.

**INCO NICKEL**

A single drop of used oil from this truck indicates true condition of the vehicle's oil . . . and tells a lot about the engine's operation.



Daily oil checks assure maximum lubrication efficiency in this diesel locomotive.

# Now—they're testing used oil in minutes

THE NEED for a fast, accurate and practical method for determining the condition of used oil has long been one of the more serious problems confronting fleet operators. It's obviously wasteful to discard still-good oil, but operating a vehicle with contaminated oil could lead to costly engine damage. This was an unsolvable condition which maintenance men had come to accept.

Since no two vehicles, even of the same make and model, are identical in performance or operation, maintenance men were compelled to compromise on oil change "averages" recommended by engine manufacturers. This procedure is uncertain and costly. Fortunately, this operating conflict has been resolved with the introduction of a simple but completely reliable oil check system . . . the Shell ADC Oilprint Analysis.

The ADC Analysis was primarily conceived to determine proper oil change intervals for individual engines. However, it goes much further. It is capable of actually reducing engine maintenance costs by disclosing certain mechanical defects *before* they have caused serious engine damage.

The test procedure is very simple . . . requires little practice to perfect . . . and provides a reliable check of oil from merely two drops of used oil. In minutes, the degree of *A*lkalinity, *D*ispersancy and *C*ontamination can be determined easily.

Here are several typical examples from various areas of the country. They show how fleet operators, employing both diesel and gasoline engines, have successfully and profitably applied the ADC program.

### A Kansas City Freight Line

Operating a large fleet of trucks, one Kansas City freight line previously had drained and replaced oil every 3,000 miles. After adopting the ADC Oilprint Analysis, individual test charts showed that, in most cases, drainage would not be necessary at less than 6,000-mile intervals. Even at this doubled interval, engine life was not affected. Further proof was established when these engines were inspected at 87,000 miles and no appreciable wear was found on bearings, pistons, rings or valves.

### An Idaho Logging Operation

Oil had previously been drained after a limited number of hours of use on an Idaho company's diesel locomo-

Substantial oil economy is realized in this tractor, because oil is changed only when indicated by the Oilprint.

Taking a quick "fingerprint" of crankcase oil from an interstate carrier.

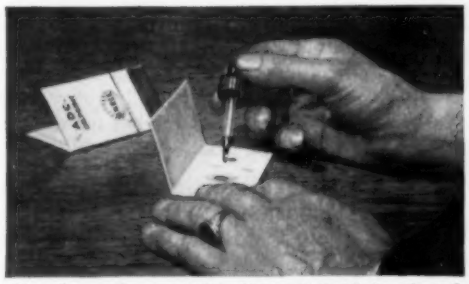
tives. With the ADC Oilprint Analysis as a guide, the oil-change interval has now been safely increased many-fold. The savings made possible by this on-the-spot test in oil, filter change and labor costs were considerable. Furthermore, leaky head gaskets are frequently discovered before any serious engine trouble develops. Here is another valuable plus for the ADC Oilprint Analysis.

### A Washington, D.C., Transit Company

This transit company operates a large fleet of buses with both gasoline and diesel engines in use. With the difference in operating schedules . . . rush hours, short and long hauls, around-the-clock schedules . . . both engine types were believed to require complete oil changes every 2,000 miles. When the ADC program was instituted, the tests showed that oil-drain periods and minor maintenance checks could be safely extended to every 3,000 miles for gasoline engines and 4,000 miles for diesel engines.

Fleet operators, who are concerned with extending the service of crankcase oil and avoiding the risk of using contaminated oil, are invited to sit in while a Shell service engineer demonstrates the time-and-money advantages of an ADC Oilprint Analysis program.

Photo shows an oil-spot test card . . . one phase in the visual life record of a change of oil.



One drop of a special indicator* fluid developed by Shell checks the alkaline reserve in the oil.

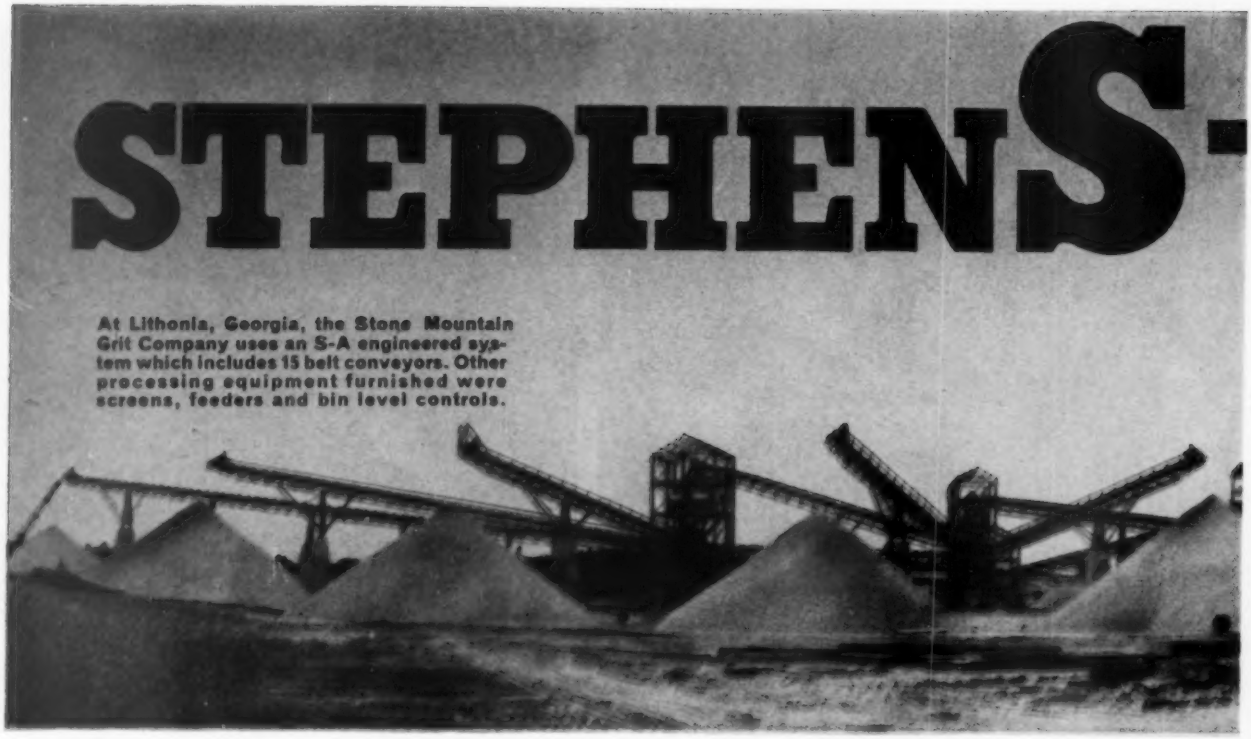
*Indicator Fluid U.S. Patent No. 2,770,530

**SHELL OIL COMPANY**

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

# STEPHENS-



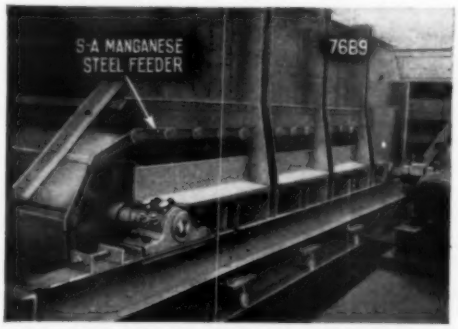
At Lithonia, Georgia, the Stone Mountain Grit Company uses an S-A engineered system which includes 15 belt conveyors. Other processing equipment furnished were screens, feeders and bin level controls.

## LONG RUN ECONOMY IN ENGINEERED ROCK PRODUCT

Rock products are, by nature, low in cost per ton. They require handling and processing costs that are proportionately low. The material handling system that has been giving you adequate service may now require some analysis under the pressures of increased output and greater buyer resistance to your product costs.

To provide long run economy in every conveying-processing job, STEPHENS-ADAMSON engineers have devised the most effective line of screening, washing, stripping, reclaiming, and conveying equipment. Wise combinations of these standardized S-A products provide engineered systems that fit the need today with full allowances for future expansion of tonnage. They range from the smallest conveyor to a system delivering hundreds of tons per hour.

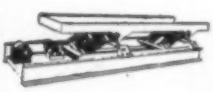
Expert advice is close to you through the S-A sales engineer in your area. Call him or write direct to any of our three manufacturing division offices.

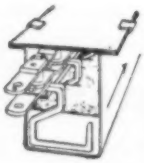



This Amsco feeder has handled more than 65,000,000 tons of stone since 1930. Pans have been changed or reconditioned about three times. Built of tough manganese steel for heavy impact, long service, in short or long units.

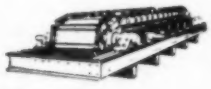
*S-A manufactures a wide range of material handling products in three complete*

BELT CONVEYORS


VIBRATING CONVEYORS


REDLER
CONVEYORS, ELEVATORS

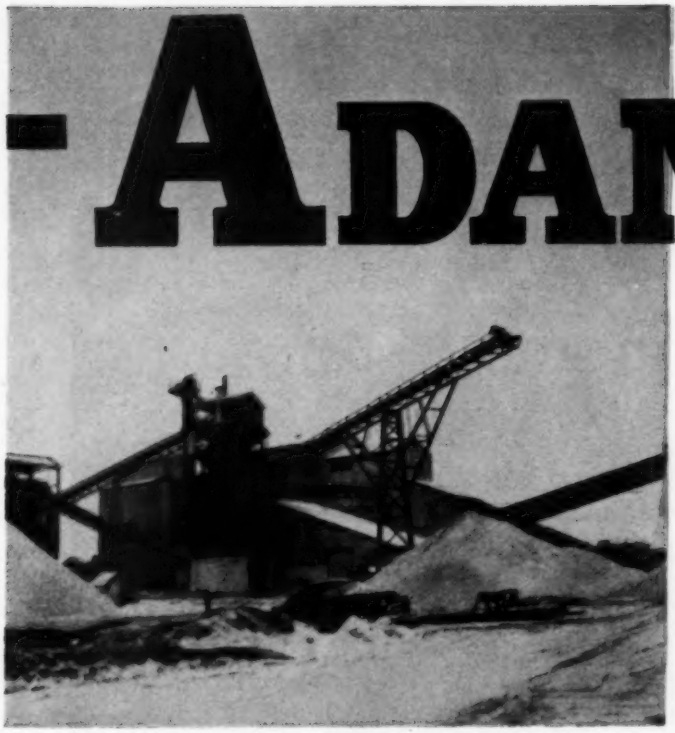
ZIPPER
CONVEYOR-ELEVATORS


PAN CONVEYORS

BUCKET
ELEVATORS

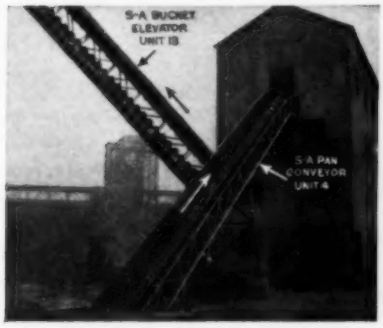
BELT CONVEYOR
TRIPPERS

# -ADAMSON

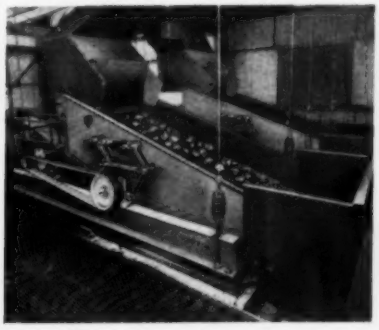


30" 755-Series Carrier, to which an Extended Lubrication Kit has been added to permit all three lubrication fittings to be located on one side of conveyor.

## CONVEYING SYSTEMS




A heavy bucket elevator and a pan conveyor unit handling gravel and stone. The bucket elevator using a deep bucket carries upward at a 45° angle. Pan conveyor fitted with armor fillers moves at a 20° slope.



A battery of heavy duty, single deck, "Vibrator" screens with suspension mounts, used in a stone plant for preliminary separation. S-A builds screens in many types and sizes for screening, scalping and washing.

390 foot belt conveyor elevates sand, gravel, and stone from a screening plant to gravity bins above automatic batch weighers. S-A builds belt conveyors in any length, and for capacities up to hundreds of tons per hour.

*plants in U. S. and Canada*

Belt Conveyors
Belt, Pan & Plate Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage & Reclaiming Systems
"Natural Frequency" Vibrating Conveyors
REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Conveyor Belt Cleaners
Headshaft Holdbacks
Grizzlies & Screens
Centrifugal Pilers
Bin Gates & Tunnel Gates
Car Pullers & Spotters
Bucket Elevators
Skip Hoists
SEALMASTER Ball Bearing Units

**WRITE FOR A BULLETIN ON ANY OF THE ABOVE PRODUCTS**

**STEPHENS-ADAMSON MFG. CO.**
20 RIDGEWAY AVENUE, AURORA, ILLINOIS
LOS ANGELES, CALIFORNIA
BELLEVILLE, ONTARIO

At Steep Rock Lake, Ontario, dredge pumps lined with Lukens "T-1" steel (321 min. Brinell) remove two million cu. yds. per month.

# Rock, Gravel Crash Through World's Most Powerful Dredges; Lukens "T-1" Steel Adds 33% to Liner Life!

TRADEMARK

Dewatering of this Canadian lake by Caland Ore Company, Ltd., will permit open-pit mining of hematite ore.

In dredging operations, impact and abrasion combine with brutal force to give pump liners expensive beatings. In the world's most powerful dredges, Lukens "T-1" steel now slashes this expense for Construction Aggregates Corp., agents for Caland Ore Co., Ltd.

*With order after order, Lukens "T-1" steel is lasting 33% longer than the abrasion resistant steel formerly used.*

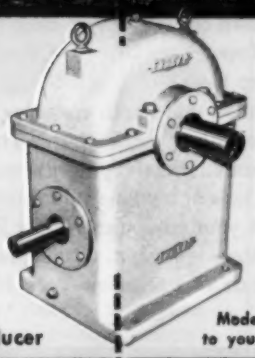
Whether you handle stone, coal, or metal ores, Lukens "T-1" steel used in the areas hardest hit by punishing abrasive impact will save you money, too. It has tripled the life of rock driers. The 321 minimum Brinell quality has been known to outlast previous metals by 18 to 1 in quarry wear plates. Chutes, hoppers, and mine cars are other typical applications.

And Lukens "T-1" steel retains its remarkable combination of hardness and toughness at temperatures well below zero. Send for our informative, illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 964, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS ®

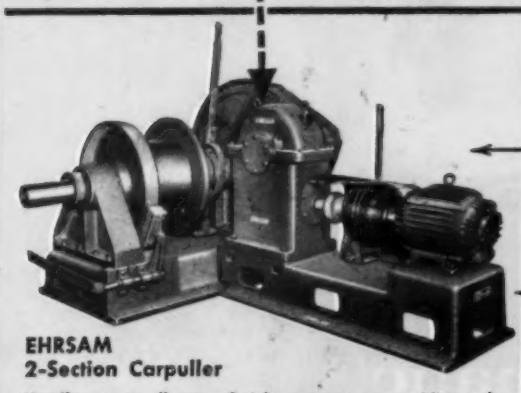
## Helping industry choose steels that fit the job

# for every Class of Service... EHRSAM



Style W Speed Reducer

9 Standard Models—Also built to your specification



EHRSAM 2-Section Carpuller

Handles, spots all types freight cars on spurs, sidings. In two sections, easily assembled. Manual or remote control. Full power, torque range. *Get detailed specifications!*

## SPEED REDUCERS TIE POWER to LOAD with GREATER EFFICIENCY

EHRSAM'S new Style W Speed Reducers deliver highest possible work efficiency to the job. You can use these tough, compact units in a complete range of service: *normal, intermittent and heaviest shock-load.* (We use this new Speed Reducer in special-application units, such as the EHRSAM 2-Section Carpuller.) New design features include alloy steel shafts, precision-ground steel worm and alloyed bronze gear; and all castings of extra-tough EHRSAM Micrometal. The new EHRSAM Style W Speed Reducers give you increased operating efficiency, reliable protection to expensive equipment throughout your plant.

***The new Style W Speed Reducer is the rugged, efficient heart of the EHRSAM Carpuller***

Write for Complete Catalogs, full specifications

EHRSAM®

*Over 80 Years of Dependable Service*

**THE J. B. EHRSAM & SONS MFG. CO.**

Dept. Q—Enterprise, Kansas

SALES OFFICES: Atlanta, Georgia; Denver, Colorado; Kansas City, Kansas
WEST COAST: Ehrsam Pacific, Inc., Riverside, California

*New Deep Hole Combination Drills*

# 10 FEET OF 3" HOLE EVERY 7 MINUTES

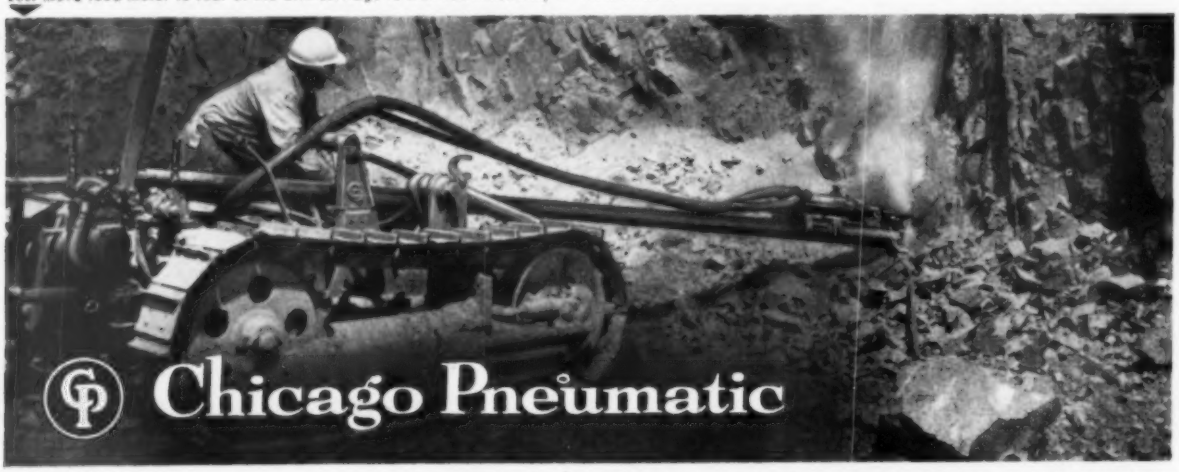
*in Hard Trap Rock!*

Drill controls stay within easy reach for drilling top holes.

And using 10 foot sectional rods on 40 foot holes total elapsed drilling time was only 34 minutes! We've teamed-up the self-propelled G-800 Tracdril and the CP 4½-inch Reversible Deep Hole Drill to give you the best in mobility and drilling performance. You can inch the Tracdril into tight spots with ease. It takes tough terrain in stride without "bull work" and tows its own compressor up steep grades.

Tops in its class, the CP-450DR Deep Hole Drill hits hard, has powerful rotation that stands crowding. Cleans hole with jet air. With this Tracdril-mounted deep hole rig you can drill toe hole or top hole with equal ease. Ask your equipment dealer for details. *Chicago Pneumatic Tool Company, 8 East 44th St., New York 17, N. Y.*

Just move feed motor to rear of the drill carriage to start toe holes only 6" from bottom.

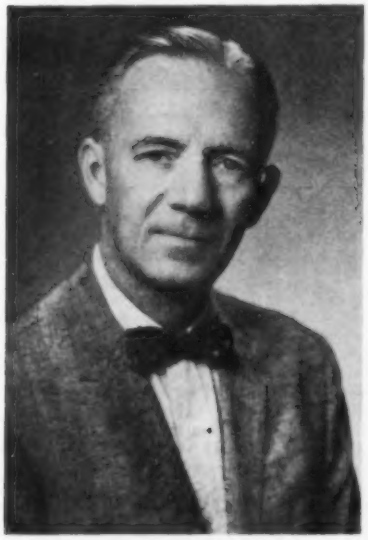



PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

# News of the Industry

## H. M. Bixby Appointed N.C.S.A. Field Engineer At National Headquarters

The National Crushed Stone Association has announced the appointment of Howard M. Bixby to



Howard M. Bixby

the N.C.S.A. engineering staff as field engineer, effective July 22. Mr. Bixby was formerly associated with the U. S. Bureau of Public Roads, and has had extensive experience in materials and highway engineering. His most recent assignment was that of regional materials engineer for Region 2, which comprises Delaware, Maryland, Ohio, Pennsylvania, Virginia, West Virginia, and the District of Columbia.

Mr. Bixby was graduated from the University of Maryland College of Engineering in 1933. He has been affiliated with the District of Columbia Department of Highways, the Nebraska Department of Roads and Irrigation with headquarters at Lincoln, and the Bureau of Public Roads in Cheyenne, Wyo. He also served in Europe during World War II.

In 1952 Mr. Bixby was transferred to San Jose, Costa Rica, as regional materials engineer for the Inter-American Highway in Guatemala, San Salvador, Honduras, Nicaragua, Costa Rica, and Panama. He returned to the United States in 1955 with the Federal Bureau's Region 2 in Hagerstown, Md.

### Cayia Retires as President Of Inland Lime & Cement

A. J. Cayia, president of the Inland Lime & Stone Company, a division of the Inland Steel Company, Manistique, Mich., has retired from his duties, effective August 1.

Mr. Cayia had been affiliated with the division for 29 years. He will be succeeded in the post of president by A. W. Heitman, who was formerly vice-president, operations.

At the time of Mr. Heitman's appointment John W. Moffat was promoted to vice-president.

## *Coming Events*

**October 9-11, 1957—New York. 40th annual meeting, National Slag Association. Plaza Hotel.**

**October 15-18, 1957—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association. The Greenbrier.**

**October 15-18, 1957—Tampa, Fla. Annual meeting, Society of Mining Engineers, and Southeastern States Mining Conference. Hotel Hillsboro and Hotel Tampa Terrace.**

**October 17-19, 1957—Austin, Tex. Operating meeting, National Lime Association. Commodore Perry Hotel.**

**October 21-25, 1957—Chicago. 45th annual National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, Hamilton, and LaSalle Hotels.**

## L. J. Wheeler of Lone Star Dies at 62 in Dallas— Served Industry 36 Years

Louis J. Wheeler, general superintendent of the Texas Division of Lone Star Cement Corporation, died on July 5 in Dallas at the age of 62.

Mr. Wheeler joined Lone Star in 1921 as a draftsman at Dallas, and shortly after was made designing engineer at the company's plant in Cuba. From there he was transferred to the New York office in the same capacity. From 1925 to 1932 he was assistant superintendent at the Bonner Springs, Kans., plant. Subsequently he served as superintendent at the Dallas and Houston plants. Later, as head of the Texas Division, he supervised the plants at Houston, Dallas, and Maryneal.

Mr. Wheeler was born in Detroit, Mich., and was graduated from the

L. J. Wheeler

University of Kansas in mechanical engineering. He was associated with Lone Star for 36 years.

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GEORGE ROSINSKI has been named sales manager of the industrial division of the Marblehead Lime Company, Chicago, Ill., and D. W. BRANAN has been appointed sales manager of its construction division.

## Explosives Institute Appeals To Handlers, Users of Caps Via Graphic New Posters

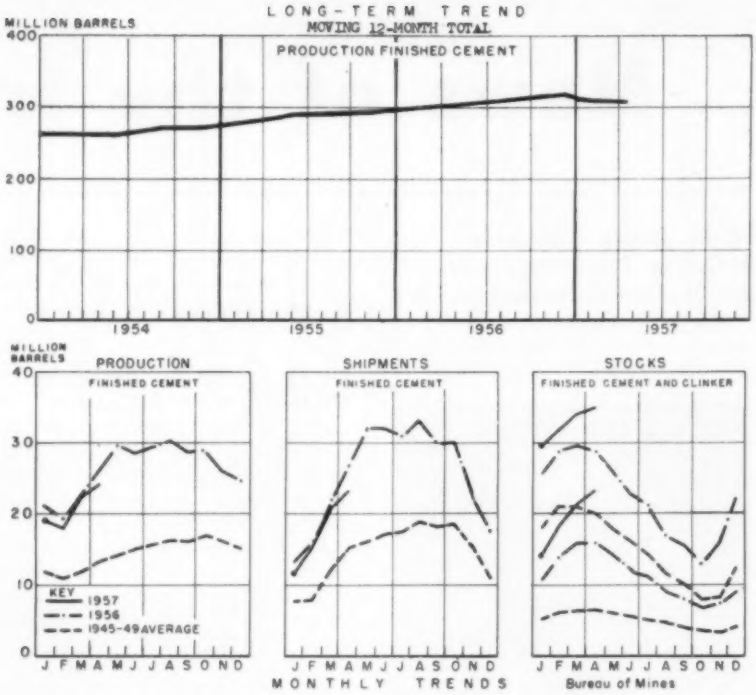
For more than 30 years the explosives industry has waged an unrelenting nation-wide campaign warning children against the perils of playing with blasting caps.

With the cooperation of youth groups, law enforcement officers, teachers, and government agencies, this industry tells children what blasting caps are and how dangerous they can be in untrained hands.

Obviously, when youngsters have been warned to leave blasting caps

alone, the other end of the chain of circumstances that leads to such accidents deserves attention — that is, how do caps get into children's hands? In this phase of the work, the Institute of Makers of Explosives, which co-ordinates the program, has had the whole-hearted backing of the explosives users. Actually, the co-operation of the men who handle and use caps is just as important as the repeated warnings to children.

In its continuing campaign against accidents, the institute is currently distributing a new poster to all users of blasting caps. It should be particularly impressive to anyone who works where blasting caps and dynamite are used. The proper handling of blasting caps involves many things, and paramount among all considerations is that they be kept safely removed at all times from the hands of reckless, daring youths who want to have a little fun. The poster drives home that point and warns, "LOCK THEM UP! SO KIDS CAN'T GET HURT."




SUMMARY—Production of finished portland cement in April, 1957, as reported to the Bureau of Mines, totaled 23,967,000 bbl., a decrease of 8 percent from April, 1956. Mill shipments in April, 1957, totaled 23,125,000 bbl., a decrease of 15 percent compared with April, 1956. Stocks of 34,893,000 bbl. of finished portland cement on hand April 30, 1957, were 22 percent more than those on hand April 30, 1956. Clinker production during April, 1957, totaled 26,114,000 bbl., an increase of less than 1 percent over the April, 1956, figure.

PRODUCTION—One hundred and sixty-three (163) plants in 37 states and Puerto Rico reported a production of 23,967,000 bbl. of finished portland cement during April, 1957, compared with 26,134,000 bbl. in April, 1956.

Clinker production during the month of April, 1957, was 26,114,000 bbl. compared with 26,047,000 bbl. during the same moth last year.

Production of high-early-strength portland cement in April, 1957, totaled 1,273,000 bbl., an increase of 49 percent over the April, 1956, production.

Production of prepared masonry cement was 1,154,000 bbl. during April, 1957, a decrease of 11 percent from the April, 1956, production.

SHIPMENTS—Mill shipments of finished portland cement for April, 1957, totaled 23,125,000 bbl. compared to 27,087,000 bbl. in April, 1956.

In April, 1957, shipments were higher in eight (8) districts and lower in fifteen (15) districts than in April, 1956. The greatest increases were in the Georgia-Florida, Louisiana-Mississippi, and Puerto Rico districts. The greatest decreases were in the Illinois, Eastern Missouri-Minnesota-South Dakota, and Kansas districts.

Mill shipments of high-early-strength portland cement in April, 1957, totaled 1,046,000 bbl., a decrease of 1 percent from the 1,059,000 bbl. shipped in April, 1956. Over half of these shipments were from mills in three (3) districts, eastern Pennsylvania-Maryland, Michigan, and Alabama. No shipments were made from mills in Puerto Rico.

Mill shipments of prepared masonry cement in April, 1957, totaled 1,178,000 bbl., a decrease of 19 percent from the 1,449,000 bbl. shipped in April, 1956. Nearly two-thirds of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-pound barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 34,893,000 bbl. of finished portland cement were on hand April 30, 1957, an increase of 22 percent over the 28,679,000 bbl. on hand April 30, 1956. Stocks of clinker increased 47 percent from 15,951,000 bbl. on April 30, 1956, to 23,429,000 bbl. on April 30, 1957.

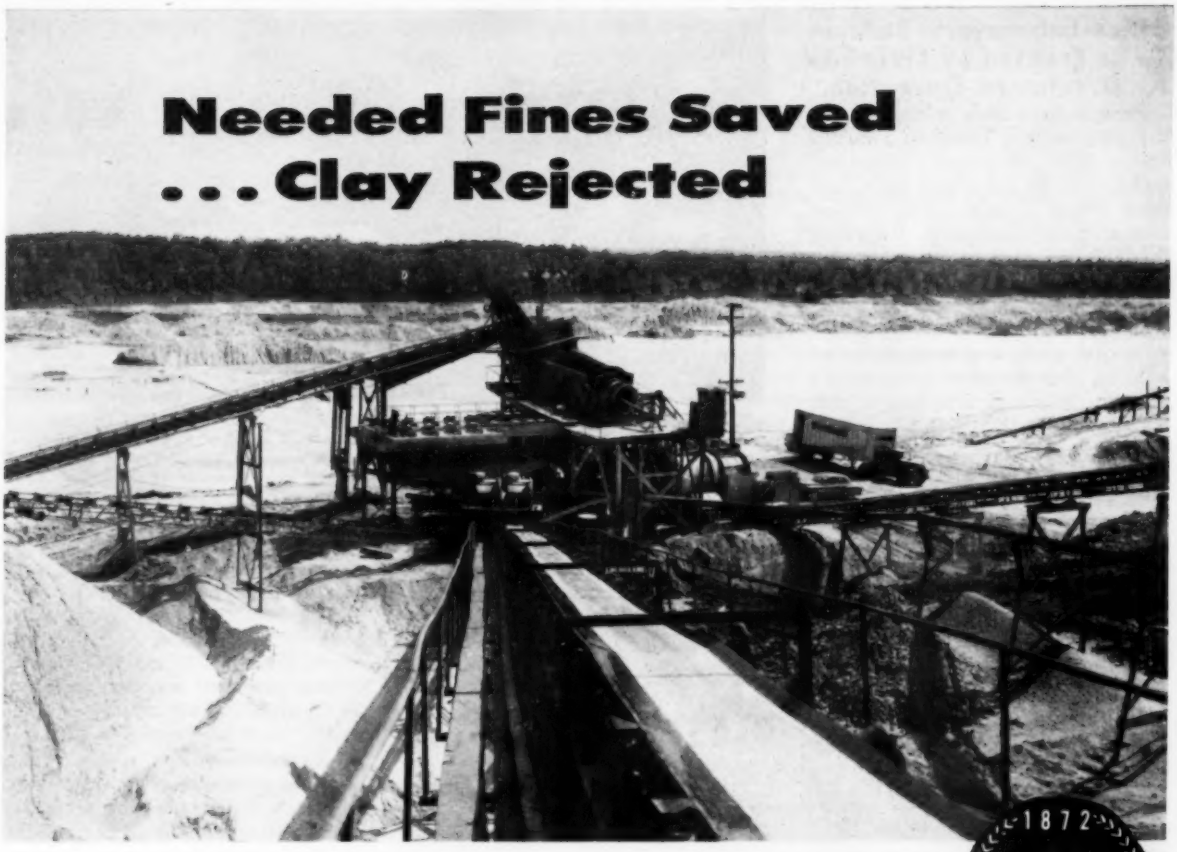
FIRST FOUR MONTHS—For the January-April period this year, the volume of production of finished cement amounted to 83,756 tons, compared with 90,538 tons in the same period of 1956. Total shipments for the first four months of 1957 are reported as 70,583 tons; in 1956 (January-April period) the total shipments were 78,511 tons.

---

Industrias Sambar of Spain will enlarge its cement plant at Zaratan, Spain, and thereby increase its output of portland cement from 9,000 to 70,000 tons per year. The improvements are expected to be completed within two years.

Out of an estimated 229,800,000 tons of cement produced in the world in 1956, Germany's 19,660,000 placed third in the world—ranking behind the United States with 53,300,000 and the U.S.S.R. with 24,900,000.

# Needed Fines Saved ... Clay Rejected



1872 85th anniversary 1957

## AN EAGLE WATER SCALPING-CLASSIFYING TANK REPLACES THREE CONE CLASSIFIERS at Becker County Sand & Gravel Co., Lillington, N. C.

Recent revamping of Becker County Sand & Gravel Co.'s Lillington, N. C., plant included installation of an EAGLE 32′ Water Scalping-Classifying Tank with automatic bleeder valves and metering "splitter" gates, to replace three 24″ cone classifiers. *Improved* removal of clay and silt has resulted and retention of fines accomplished. Concrete sand is their main product, some masons sand being produced.

Formerly material was routed from a wet scrubber screen to two 36″ dia. single screw washer-classifier-dehydrators. Excessive wash water overflow from these screws was pumped to the cones to salvage fines. Now, the fines retention is done initially, with the water scalping-classifying tank ahead of screw units. The precipitated material from the classifying tank flows through a multi-cell collecting-blending flume to the screw units for further removal of silt and clay, final classifying and final dehydrating. The multi-cell flume provides for wasting of excess coarse material when necessary.

The unbeatable combination of an Eagle Water Scalping-Classifying Tank with one or more Eagle Screw Units has solved problems for hundreds of aggregate producers—enabled them to meet specifications—increase their profits through low maintenance equipment. Learn what "tried and true" Eagle Equipment can do for you—send for catalog!

SINCE 1872

EIW
EAGLE IRON WORKS

# EAGLE IRON WORKS

133 HOLCOMB AVE., DES MOINES, IOWA

## Office-Laboratory Building To Be Erected by Riverside At Crestmore Operation

Designs have been completed and the construction contract awarded for a new office and laboratory building to be erected at the Crestmore (Calif.) plant of the Riverside Cement Company. Estimated cost of the structure is approximately $661,500.

In addition to concrete floors, columns, and roof framing in the structural shell, and a pretensioned balcony slab to connect the upper floor levels, a new light-weight concrete block, and several forms of multi-colored concrete panels and tiles will be used. Other features include floating staircases, precast concrete sunshade units, and a cement tile mural in the main lobby.

Architect's sketch of Riverside Cement Company's proposed laboratory and office building, to be constructed at Crestmore, Calif.

One wing will contain laboratories on the ground floor, and drafting rooms and engineering offices on the second floor. In the other wing, above a ground-floor garage there will be a floor containing a conference room and offices grouped about an inner, landscaped patio. A penthouse has been designed to house mechanical and telephone equipment.

The analytical section of the laboratory will contain instruments for X-ray spectrographic analysis in addition to other laboratory apparatus specially designed for maintaining chemical control of raw materials and finished products. The sample preparation section will contain crushers and pulverizers and will be completely insulated for noise and vibration. Twaits-Wittenberg of Los Angeles will construct the building, which is scheduled for completion in the late spring of 1958.

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THEODORE R. ARMSTRONG was promoted from the post of Philadelphia district sales manager of the Giant Portland Cement Company to sales manager. FREDERICK W. GROSS succeeds Mr. Armstrong.

---

C. W. COBB was named general manager of the Batesville (Ark.) White Lime Company. He was previously vice-president and general manager of the Arkansas Limestone Company, a subsidiary of the Batesville company.

**SERIES "700" WITH BREAK-OUT LUGS SIZES 3⅞"-5⅝" FOR HEAVY DUTY ROTARY AIR DRILLING CUTS HOLE TIME**

Rotary air drilling, with Hawthorne "Blue Demon" Series "700" Carbide Insert Bits, has been increasing drilling speeds up to 50%, with progressively decreasing drilling cost per ton.

The Series "700", using carbide inserted replaceable blades, was designed for hard rock exploration air drilling on the Edwards Plateau and has proved equally successful in quarry type drilling in medium-hard and softer limestone and sandstone.

Many areas previously requiring more expensive roller bits are now successfully using Hawthorne "Blue Demon" Bits.

Break-out lugs facilitate rapid replacement of expendable worn blades, since quarry drilling requires frequent bit change.

Hawthorne's experience and reputation in efficient bit design and manufacturing quality in the field of resources exploration is now available to the blast hole drilling industry.

In average quarry drilling, you should check the possibilities of Hawthorne "Blue Demon" Carbide Bits for increased drilling efficiency.

*Write TODAY for your FREE copy of "Blue Demon" Bit Catalog 656 which fully describes and prices the complete line of Hawthorne Bits in sizes from 1⅞" through 13", and for recommendations for your specific drill.*

HERB J. HAWTHORNE INC.
P. O. BOX 7366, HOUSTON 8, TEXAS
Cable Address: HAWBIT

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**FOR MANUAL APPLICATION**

| THIS HARD-FACING ROD | FOR THESE CONDITIONS | FOR THIS EQUIPMENT | APPLI-CATION |
|---|---|---|---|
| VICTORTUBE | Severe abrasion | Ripper and ditcher teeth, dredge cutter blades, posthole augers, oil field tools, pug mill knives | ACETY. AC-DC ELEC. |
| VICTORTUBE BARE-30-DOWN | Severe abrasion | Agricultural tools | ACETY. ONLY |
| VICTORTUBE "SPECIAL" | Abrasion, severe impact | Oil field bits, rock bits | ACETY. ONLY |
| VICTOR TUNGSMOOTH | Thin cutting | Augers, bits, blades, screw conveyors, farm tools | ACETY. AC-DC ELEC. |
| VICTORITE | Earth abrasion, sliding friction | Farm tools, earthmoving rigs | ACETY. AC-DC ELEC. |
| TUBE VICTORITE | Abrasion, impact | Plow points and farm tools | ACETY. AC-DC ELEC. |
| VICTORITE 1 | Corrosion, heat, abrasion | Chemical and food machinery, arbors, screw conveyors, soaking pit tongs | ACETY. AC-DC ELEC. |
| VICTORITE 6 | Red heat, impact corrosion, abrasion | Forming dies, exhaust valves, cams, steam valves | ACETY. AC-DC ELEC. |
| VICTORITE 12 | Heat, abrasion, impact | Saw blade inserts and other critical applications | ACETY. AC-DC ELEC. |
| VICTORITE CARBON ARC | High abrasion, thin deposit | Plowshares, lister shares, sweeps | CARB. ARC ACETY. |
| VICTORALLOY | Abrasion, severe impact | Crushers, dredge pumps and cutters, dipper teeth, tampers, rollers, idlers | ACETY. AC-DC ELEC. |
| VICTORALLOY #1 | High abrasion, medium impact | Bucket lips, rock crushers, muller tires, gyratories | ACETY. AC-DC ELEC. |
| VICTORALLOY "A" | Angular shock, extreme impact, build-up | Clutch parts, gears, crusher plates, gyratory mantles, build-up for hardfacing | AC-DC ELEC. ONLY |
| VICTORALLOY "B" | Heavy impact, moderate abrasion | Tractor rollers and sprockets, shovel pads, plates, idlers, etc. | AC-DC ELEC. ONLY |
| VICTORALLOY "C" | High abrasion, moderate shock and impact | Tractor grousers, pressure rolls, crusher segments, roll crusher teeth | AC-DC ELEC. ONLY |
| VICTOR MULTI-PASS | Impact, compression, build-up | Drive sprockets and tumblers, rollers, idlers, churn drills, clutch jaws | AC-DC ELEC. |

# What's proper Victor rod for your hardfacing needs?

## *THIS CHART GIVES YOU QUICK ANSWER*

Use it to select right rods for prolonging operating life of your equipment. You'll be selecting rods that go on quickly and smoothly, thereby saving labor and downtime. Order from your Victor dealer TODAY.

FREE—For more detailed information on how to apply Victor hardfacing alloys to wearing parts, write us NOW for your copy of Victor Hardfacing Manual. It's free.

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**for hardfacing**

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**VICTOR EQUIPMENT COMPANY** • *Alloy Rod & Metal Division*

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**FOR AUTOMATIC & SEMI-AUTOMATIC APPLICATION**

| THIS TYPE | FOR THESE CONDITIONS | ON THIS KIND OF EQUIPMENT |
|---|---|---|
| #0 | High abrasion, medium impact | Crusher rolls, rock crushing equipment |
| VA #1 | Abrasion, medium impact | Crushers, scraper blades |
| VA #2 | Abrasion, impact, Multi-pass application | Steel mill applications, tractor idlers |
| VA #3 | Abrasion, light impact | Mill guides, crushers, dredge bushings |
| VA #4 | Multiple layer build-up | Tractor rollers and idlers, sheave wheels |
| VA #5 | Heavy impact, abrasion | Tractor rollers, idlers, mine car wheels, sheave wheels |
| VA #6 | Medium abrasion, high impact | Crane wheels, drums, roll necks |
| VA #7 | Abrasion, high impact | Build-up for hardfacing, mine car wheels |
| VA #8 | Abrasion, high impact | Roll crushers, scraper and grader blades, tool joints |
| VT #60 | Extreme abrasion | Tool joints, grader blades, scraper blades |
| Mo-Mn | Manganese build-up | Wherever manganese build-up needed |

SCREENS
FOR VIBRATING EQUIPMENT
CLEVELAND Wire Screen Sections maintain rigid accuracy of openings in day-in, day-out shattering actions of high-tonnage vibrating units. Tough, yet ductile, CLEVELAND Wire Screen Sections have fewer breaks, prove greater resistance to abrasion, corrosion, and fatigue.
Designed for all types of mechanical and electrical vibrators CLEVELAND Wire Screen Sections are available in all standard weaves and crimps.
COMPLETE SAMPLE SERVICE
Our Sample Service Department can take the guesswork out of wire selection. An exact sample of the wire gauge, opening dimensions, and weave will be sent to you for approval. Send us your requirements, job applications, and specifications.
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The CLEVELAND
WIRE CLOTH & MFG. Co.
3576 EAST 79TH STREET • CLEVELAND 5, OHIO


## Pit & Quarry's Mrs. Tenney Saying, "Hello!" at Home

Mrs. Gene Tenney

Beginning August 12, telephone calls made to PIT AND QUARRY in Chicago have been answered by an unfamiliar voice. Mrs. Gene Tenney, a P. and Q. employee with an unusually long term of service, retired from her duties after more than 28 years as receptionist and switch board operator.

On her last day at her desk Mrs. Tenney was honored by her co-workers at a luncheon, and presented with a watch, as a P. and Q. remembrance.

Mrs. Tenney began her association with the company when our headquarters were in the Rand McNally Building. She presided at her post from January 14, 1929, until August 9 of this year, cheerfully and efficiently performing her many and varied duties. She will be sincerely missed by her friends among the staff and also by others whom she has contacted throughout her years in our organization. We wish her all the joys of leisurely days as she begins an unfamiliar life without benefit of alarm clocks and Loop rush hours. Happy days, Mrs. Tenney!

---

ROBERT L. MITCHELL has been appointed district sales manager for the metropolitan New York sales district of Penn-Dixie Cement Corporation. He succeeds E. Carl Matheson, who was recently named assistant general sales manager.

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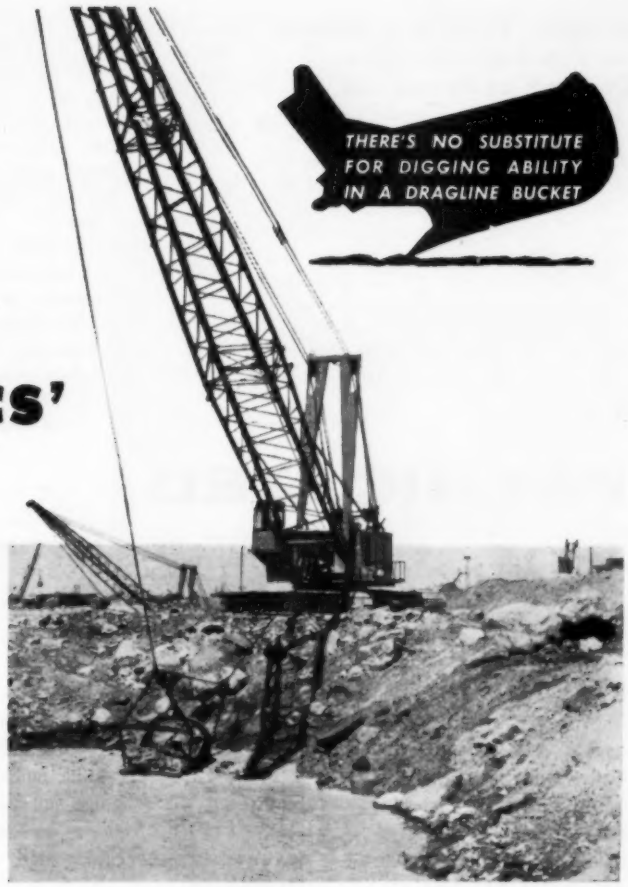
*here's where*

**PAGE AUTOMATICS'**

*Digging Ability pays off....*




Underwater digging . . . where the operator can't see his bucket . . . is one place where the superior digging ability of a Page Automatic pays off in maximum yardage.

This 4½ cu. yd. Page Automatic is digging loose gravel, stone and clay at depths to 30 ft., and getting full rated loads every cycle. The automatic digging action built into every Page Automatic means that operators don't have to jockey the bucket to load it. The first pull on the loadline shifts the balance forward, concentrating a high percentage of the bucket's weight on the tooth points to make it dig and fill in 1½ to 2 lengths.

Faster loading means more cycles and maximum production from your machine. To get digging ability—get a Page Automatic—the bucket that's guaranteed to outperform ordinary old style buckets under *any* digging conditions.

*Write for Bucket Catalog GPB554 today.*

PAGE ENGINEERING COMPANY
CLEARING P.O. – CHICAGO 38, ILLINOIS

**Maximum loads are automatic with Page Automatics—the dragline bucket with digging ability built right in.**

**Page**

**Automatic Dragline Buckets**
**Walking Draglines**

*If it's a* PAGE... *It* DIGS

B-3109

## Hensley, Matheson, Named To Top Sales Positions On Staff of Penn-Dixie

Officials of the Penn-Dixie Cement Corporation have announced the appointment of Donald L. Hensley as general sales manager and E. Carl Matheson as assistant general sales manager. These appointments became effective August 1.

Mr. Hensley was graduated from the University of Pittsburgh and later served as football coach there. He became associated with the cement industry in 1939 and joined Penn-Dixie in a sales capacity in Boston in 1942. Four years later he was transferred to the company's New York sales office and was made district sales manager and then assistant general sales manager.

Mr. Matheson graduated from Penn State and immediately entered the cement industry. His association with Penn-Dixie dates from 1937, when he joined the company as assistant district sales manager in Boston. Mr. Matheson was named district sales manager in Rochester in 1939 and subsequently served in the same capacity in Boston and New York.

Donald L. Hensley

Penn-Dixie has sales offices in New York, Pittsburgh, Boston, Chicago, Detroit, Atlanta, Des Moines, Chattanooga, Milwaukee, Buffalo, Petoskey and Holland, Mich., and Nazareth, Pa.

E. Carl Matheson

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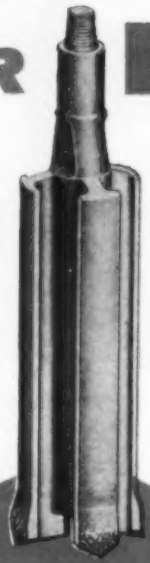
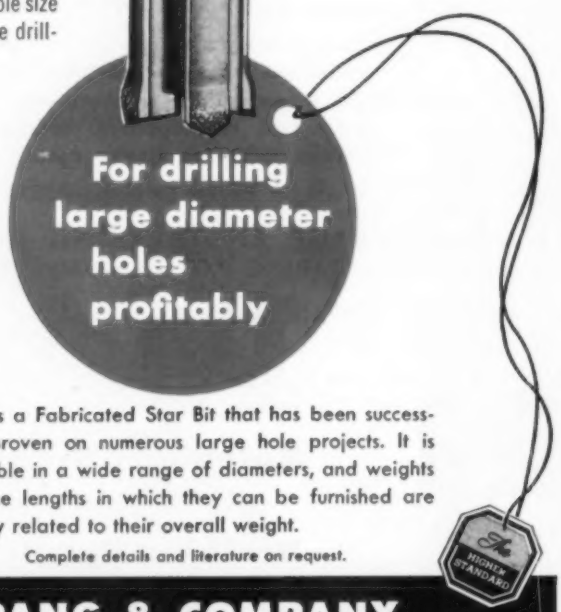
Universal Atlas Cement Company, New York, N. Y., a subsidiary of United States Steel Corporation, is acquiring more than 1,000 acres of limestone-bearing land in Minnesota as a site for a possible cement plant. The property is near Planks, 15 miles southeast of Rochester. The company's Duluth plant is the only cement mill in Minnesota.


FABRICATED STAR BITS



The Fabricated Star Bit shown here has been designed especially for big hole drilling in hard formations. Far more efficient than the old style spudding bit and the big hole paddle-type bit, these Star Bits are custom-engineered to suit the particular hole size and the capacity of the drilling machine used.

Spang Fabricated Star Bits save labor and money. They can be quickly dressed to gauge, and speedily ready for drilling, by hard surfacing the cutting edge.




Here is a Fabricated Star Bit that has been successfully proven on numerous large hole projects. It is available in a wide range of diameters, and weights . . . the lengths in which they can be furnished are directly related to their overall weight.

Complete details and literature on request.

SPANG & COMPANY

DEPT. M-3 BUTLER, PENNSYLVANIA

For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Prospect Drilling and Shot Blast Holes.

| MILES PER HOUR | ENGINE REVOLUTIONS PER HOUR IN CONVENTIONAL AXLE HIGH | IN EATON AXLE HIGH-HIGH | SAVED |
|---|---|---|---|
| 10 | 37480 | 33995 | 3485 |
| 20 | 74960 | 67990 | 6970 |
| 30 | 112440 | 101985 | 10455 |
| 40 | 149920 | 135980 | 13940 |
| 50 | 187400 | 169975 | 17425 |

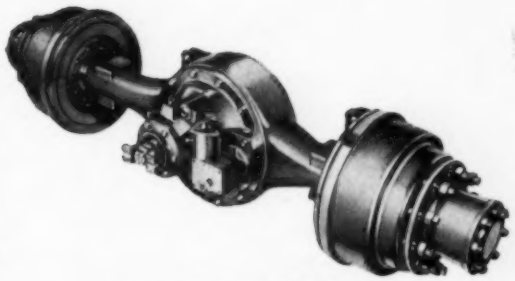
Based on most popular axle ratios and tire size.

# EATON 2-Speed Axles Cut Down "Revolutions per Mile"

## Save Operating and Maintenance Costs—Make Trucks Last Longer!

**The chart above shows the big reduction in engine revolutions made by Eaton 2-Speed Axles in high-high gear ratio. Fewer Revolutions per Mile mean reduced piston travel, less wear on every rotating engine part and power transmitting unit.**

**Not only when highballing on the open highway—but in every hauling situation—pulling out of the hole under full load, climbing steep grades, maneuvering in city traffic—Eaton 2-Speeds save wear and tear on engines by permitting them to operate in their most economical speed range. This results in important savings in operating and maintenance costs, thousands of extra miles between engine overhauls, fewer interruptions of operation, and more miles in the life of the truck.**



**More than Two Million Eaton Axles in Trucks Today. For complete information, see your truck dealer.**

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**PRODUCTS:** Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps Motor Truck Axles • Permanent Mold Gray Iron Castings • Forgings • Heater-Defroster Units • Automotive Air Conditioners Fastening Devices • Cold Drawn Steel • Stampings • Gears • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

**Greater Loading and Unloading Capacity with**

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**CONVEYING AND LOADING EQUIPMENT**

MODEL 124 ATLAS CAR UNLOADER, UNLOADING SLAG.

**Atlas Car Unloaders are giants for performance! They have earned a reputation throughout the country for efficient and reliable material handling operations with exceptionally low operating and maintenance costs.**

Please send me your bulletin on the Model 124 Atlas Car Unloader.

Name .....

Company .....

City ..... State .....

**ATLAS CONVEYOR CO.,**
CLINTONVILLE, WIS.

Big boom at Little Valley. This show shows the high point of the July 21 blast, which produced 1,600,000 cu. yd. of material for the Southern Pacific's new causeway across Great Salt Lake. Carefully planned control of the detonation is evident by the minimum of geysers of dirt, dust, and flying rock.

### 3,000,000-Ton Blast Set Off For Salt Lake Causeway Fill

On July 21 a blasting operation described as the "biggest nonatomic explosion ever set off in the United States" thundered across Little Valley, Utah, from a spot on a peninsula in Great Salt Lake. Approximately 1,600,000 cu. yd. of rock was blasted loose from a cliff by the Morrison-Knudson Construction Company, contractor for the job of building a 13-mile dirt causeway across the lake to replace the Southern Pacific Railroad's wooden trestle. Material from the giant explosion will be hauled to the site of the fill.

To produce the detonation 1,790,000 lb. of explosives (Atlas Amcol and 60 percent Extradynamite) was used. These explosives were packed into four 5- by 7-ft. coyote holes with a total length of 2,600 ft. in the 200-ft. high cliff and into tunnels 1,300 ft. long, connecting the holes.

This blast was the fourth in a series to provide fill material. The $49,000,000 project is expected to be completed by 1960.

### 1957 ACP Raises Maximum Of Cost-Share to $2,500

True D. Morse, Acting Secretary of Agriculture, has announced the 1958 Agricultural Conservation Program for sharing the cost of approved conservation practices with farmers and ranchers. Congress has authorized $250,000,000 for the 1958 program.

The 1958 ACP will be substantially the same as the 1957 program now in operation, except for one major change. Under recently passed legislation, the Congress has raised the maximum cost-share that any one person may receive from $1,500 to $2,500. State and county Agricultural Stabilization and Conservation (ASC) Committees will administer the ACP as in the past.

State ASC committees are now developing their proposed programs for submission to the Secretary of Agriculture. County ACP programs will be developed and approved within the provisions of the national ACP and the approved state programs.

States and counties are expected to announce their 1958 conservation program practices, specifications, and cost-share rates before 1958.

More than 1,260,000 farmers and ranchers, or more than one out of five, participated in the 1956 ACP. The average cost-share received by farmers for conservation practices was $150, indicating widespread distribution of the assistance available under the program for installing soil- and water-conserving practices on farms and ranches.

---

Sales of the Bestwall Gypsum Company for the year ended December 31, 1956, including sales of the Gypsum and Paper Division of Certain-teed Products for the six months ended June 30, 1956, totaled $31,588,457. Net income amounted to $3,733,599.

---

General Refractories Company of Philadelphia, Pa., reported first-quarter net earnings of $1,963,082 or $1.48 a share as compared with $1,503,065 or $1.14 a share in 1956.

# NEW MACK

## heavy-duty four- and six-wheel dumpers

### 15- to 34-ton capacity

### ✻ LARGEST SELECTION OF HEAVY DUMPERS

Mack offers you the most complete line of dumpers for mining, quarrying, road building, construction. From heavy-duty 170 horsepower, four-wheel dumpers with 15-ton capacities to super-duty 400-horsepower, six-wheel dumpers with 34-ton capacities, Mack provides the economy and performance that can mean bigger hauling profits for you.

### ✻ CHOICE OF ENGINES

Mack offers you a choice of engines . . . Cummins diesels in the 300- and 400-horsepower class . . . or Mack Thermodyne and Cummins diesels in the 170 to 205 horsepower class. No need to alter existing maintenance facilities to handle new engine makes . . . you get the truck you want with the engine you want.

### ✻ OUTSTANDING PERFORMANCE

When you buy Macks, you know that you are getting top performance, outstanding economy, maximum dependability—qualities that have made Mack the acknowledged heavy-duty truck leader in the industry. Moreover, Mack dumpers are planned for accessibility throughout . . . engines are easily reached, no place in the suspension ever needs adjustment—these and many more Mack features reduce maintenance costs and make routine servicing easier. And in Macks, you get the finest transmissions and axles available . . . made by Mack and found only in Macks!

### ✻ COMPETITIVELY PRICED

Mack off-highway dumpers are priced right in line with competitive makes. Yet, with Macks, you get those "extras" that mean more payloads at lower hauling costs . . . cabs engineered for maximum driver efficiency . . . specially designed components with extensive use of heat-treated alloy steels . . . single-unit all-welded frames that can take plenty of hard knocks . . . outstanding performance and economy from a complete line of engines.

### ✻ STOCK DELIVERY

All 15 and 22½-ton Mack dumpers are available from stock. The units you want with the engines and transmissions you want can be supplied upon gratifyingly short notice. There are no delays, no production schedules for you to worry about. For more information on delivery, contact your local Mack Dealer or Representative.

# MACK LRX

**capacity: 15 tons**

This four-wheel, off-highway dumper combines a big 15-ton rated capacity with outstanding maneuverability. Either a Mack or Cummins Diesel engine —along with heavy-duty clutch, 10-speed transmission, and Mack's Planidrive rear axle assembly —gives plenty of pulling power for long hauls on steep grades. Rugged, unified frame assembly, powerful air brakes, and comfortable cab with driver's position offset to the left assure the top performance and efficiency that have made the LRX a highly popular dumper in mine, quarry, and road-building operations.

## CONDENSED SPECIFICATIONS

### STANDARD EQUIPMENT

| DIMENSIONS: | 14.00-24 Rear Tire |
|---|---|
| Wheel Base | 13′ 4″ |
| Platform | 9′ 1″ |
| Overall Width | 9′ 11″ |
| Overall Height | 10′ 8″ |
| Overall Height (Body Raised) | 18′ 8″ |
| Overall Length | 24′ 7½″ |
| Turning Circle Diam. (To outside edge of tire) | 60′ |
| Weight (Chassis, Body & Hoist) | 33,000 lbs. |
| Payload | 30,000 lbs. |

**ENGINE (Diesel):**

| | |
|---|---|
| Model | END 673 |
| Make | Mack, Thermodyne |
| Type | Naturally aspirated |
| Number of cylinders | Six |
| Bore and stroke | 4⅞″ x 6″ |
| Piston displacement, cu. in. | 672 |
| Brake horsepower @ 2100 r.p.m. (gov.) | 170 |
| Max. torque @ 1200 r.p.m. | 480 lb.-ft. |

**CLUTCH (Available with END 673 only):**

| | |
|---|---|
| Type | Mack single-plate, dry |
| Area of engagement, sq. in. | 253 |

**ELECTRICAL SYSTEM:**
Voltage and capacity . 12 V., 50 Amp. (24 V., Starting)

**TRANSMISSION:**

| | |
|---|---|
| Type | Mack selective, constant mesh |
| No. of speeds, forward | Ten |
| reverse | Two |

**FRONT AXLE:**
Make . Mack Reversed-Elliott, drop-forged I-beam

**REAR AXLE:**

| | |
|---|---|
| Make | Mack Planidrive |
| Drive | Dual Reduction |
| Final Drive (3rd reduction) | Planetary gear train within wheel hubs |
| Total Ratio | 16.5 |

**BRAKES (Air):**

| | |
|---|---|
| Compressor | Tu-Flo |
| Type | Internal expanding |
| Front, size | 17¼″ x 5″ x ¾″ |
| Rear, size | 20″ x 7″ x ¾″ |
| Hand, size | 12″ x 5″ x ⅛″, Bendix |

**FRAME:**

| | |
|---|---|
| Side-members, size | 12½″ x 6¼″ x ½″, wide flange I-beam, rolled section |
| Section modulus | 60.7 (per rail) |

**SPRINGS:**

| | |
|---|---|
| Front, type | Semi-elliptic |
| Rear, suspension | Semi-rigid, axle mounted to frame |

**WHEELS:**
Type . . . Cast, spoke

**STEERING GEAR:**
Control . . . Manual

| TIRES: | Front | Rear |
|---|---|---|
| Size | 12.00-24 (16P) Rib | 14.00-24 (20P) Lug |

**CAB:**
**Type:** Heavy-duty off-highway, closed, all-steel welded. Offset 10¾″ to left of chassis centerline provides clear vision for driver to rear.

**CHASSIS EQUIPMENT:** Front and rear tow pins; air horn on cab roof; cab entrance steps and platforms; rear view mirror, left side; channel type front bumper; dual windshield wipers; vertical exhaust; stop-tail light; rim lug wrench and handle.

**HOIST:**
Make & model . . . Heil
Type-Twin, double-acting, 8″ diameter, hydraulic cylinders with 24″ stroke, 70° dumping angle.

**BODY:**

| | |
|---|---|
| Type | Rock, with scoop end |
| Make | Heil |
| Capacity, line of plate | 9.8 cu. yds. struck |

**Construction:** ¼″ steel plate shell bottom; ⅜″ sides and header; ½″ wear and side bevel plates; ¼″ canopy. 3″ x 5 lb. channels between floor plates either side of a 1⅝″ edge-grain hardwood middle section filler.

### OPTIONAL EQUIPMENT

**ENGINE (Diesel):**

| | | |
|---|---|---|
| Model | NHB | ENDT 673 |
| Make | Cummins | Mack, Thermodyne |
| Type | Naturally aspirated | Turbocharged |
| Number of cylinders | Six | Six |
| Bore and stroke | 5½″ x 6″ | 4⅞″ x 6″ |
| Piston displacement cu. in. | 743 | 672 |
| Brake horsepower @ 2100 r.p.m. (gov.) | 200 | 205 |
| Max. torque @ r.p.m. | 1200 | 1400-1600 |
| pound-feet | 537 | 560 |

**CLUTCH (Included with NHB and ENDT 673):**

| | |
|---|---|
| Type | Mack two-plate, dry |
| Area of engagement, sq. in. | 416 |

| TIRES: | Front | Rear |
|---|---|---|
| Size | 13.00-24 (18P) Rib | 16.00-25 (20P) Lug |

**BODY:**

| | |
|---|---|
| Type | Flared Quarry |
| Make | Heil |
| Capacity, line of plate | 11 cu. yds. struck |

**Construction:** ¼″ steel plate shell bottom; ½″ sides; ½″ header, slope; ⅜″ header, vertical; ½″ wear plate; ¼″ canopy. 3″ x 5 lb. channels between floor plates either side of a 1⅝″ edge-grain hardwood middle section filler.

**Body Equipment:** (for std. and opt. bodies)—(9) ¾″ x 6″ alloy wear bars; rock ejectors; ½″ alloy wear plate; horizontal bolsters (3 per side); canopy, loose for export shipment. (for std. body only): exhaust heating connections; welded-on side boards.

**CHASSIS EQUIPMENT:** Automatic radiator shutters; Wagner "BB" (24 hour chart 0-3500 r.p.m.) tachograph, in place of standard Tachometer; speedometer; hubodometer, left front wheel; Vickers power steering; front wheel limiting valve; hand control valve to operate rear service brakes; low air pressure indicator, Wig-Wag type; screen type radiator guard; 25,000 B.T.U. hot water cab heater with defrosters; spare rim; hydraulic jack, 20-ton; air starting; cold starting equipment; insulating dash mat.

**MACK — FIRST**

# MACK LVX

**capacity: 22½ tons**

This four-wheel dumper with its 22½-ton rated capacity provides maximum payloads at minimum unit cost. Equipped with either a 300 or 335-horsepower engine, over-gear transmission with two-speed compound or torque converter, and Mack's exclusive Planidrive rear axle assembly, it is powered to give top performance under the most punishing operating conditions. All-welded, single-unit, alloy-steel frame gives LVX's stamina and rugged durability. Elbow steering column, hydraulic steering booster, two-plate air-assisted clutch, and job-engineered cab with extreme left driver position assure maximum operating efficiency. From top to bottom, this big Mack gives you the "extras" that mean minimum hauling costs.

## CONDENSED SPECIFICATIONS

### STANDARD EQUIPMENT

**DIMENSIONS:**

| | |
|---|---|
| Wheelbase | 14' 2" |
| Platform | 9' 11" |
| Overall Width | 11' 2" |
| Overall Height | 11' 4⅝" |
| Overall Length | 26' 7½" |
| Overall Height (Body Raised) | 21' |
| Turning Circle Diam. (To outside edge of tire) | 62' |
| Weight (chassis, body & hoist) | 40,800 lbs. |
| Payload | 45,000 lbs. |

**ENGINE (Diesel):**

| | |
|---|---|
| Model | NHRBIS |
| Make | Cummins |
| Type | Supercharged |
| Number of cylinders | Six |
| Bore and stroke | 5½" x 6" |
| Piston displacement, cu. in. | 743 |
| Brake horsepower @ 2100 r.p.m. (gov.) | 300 |
| Max. torque @ 1500 r.p.m. | 818 lb.-ft. |

**CLUTCH:**

| | |
|---|---|
| Type | Mack Two-plate, dry |
| Area of engagement, sq. in. | 416 |
| Actuation | Manual, with air assist |

**ELECTRICAL SYSTEM:**
Voltage and capacity . 12 V., 50 Amp. (24 V. Starting)

**TRANSMISSION:**

| | |
|---|---|
| Type | Mack selective, constant mesh |
| No. of speeds, forward | Eight |
| reverse | Two |

**FRONT AXLE:**
Type . . . Mack Reversed-Elliott, drop-forged I-beam

**REAR AXLE:**

| | |
|---|---|
| Make | Mack Planidrive |
| Drive | Dual Reduction, spiral bevel |
| Final drive (3rd reduction) | Planetary gear train within wheel hubs |
| Total Ratio | 17.66 |

**BRAKES (Air):**

| | |
|---|---|
| Compressor | Tu-Flo |
| Type | Internal expanding |
| Front, size | 17¼" x 5" x ¾" |
| Rear, size | 18" x 10" x ¾" |
| Hand, size | 12" x 5" x ⅜" |

**FRAME:**

| | |
|---|---|
| Type | I-beam, wide flange |
| Material | Alloy steel |
| Side-members, size | 13¹¹⁄₁₆" x 8" x ⅝" (Fabricated) |
| Section modulus | 74.8 per rail |

**SPRINGS:**

| | |
|---|---|
| Front | |
| Type | Semi-elliptic |
| Suspension | Mack rubber shock insulators |
| Rear | |
| Type | Progressive rate, semi-elliptic |
| Suspension | Cam face slipper ends with radius rods |

**TIRES:**

| | Front | Rear |
|---|---|---|
| Size | 14.00-24 (16P) Rib | 18.00-25 (24P) Lug |

**WHEELS:**
Type . . . . . Cast, spoke

**STEERING GEAR:**
Power steering assist . . . Vickers hydraulic booster

**CAB:**
Type . Heavy-duty off-highway, closed, all-steel, welded. Cab offset 10¼" to left of chassis centerline provides clear vision for driver to rear.

**CHASSIS EQUIPMENT:** Screen type radiator guard; front and rear tow pins; air horn on cab roof; dual windshield wipers; two air reservoirs; rear view mirror, left side; Mack power take-off and control (not available with Allison Transmission); door in hood side for access to oil filler and dip stick; exhaust through hood with inline muffler; channel type front bumper; stop-tail light; rim lug wrench and handle.

**HOIST:**
Type . . . Twin, double-acting, outboard mounted, three section telescopic cylinder assembly directly connected to body and chassis through a universal joint arrangement providing a 70° dumping angle.

**BODY:**

| | |
|---|---|
| Type | Rock, with scoop end |
| Make | Heil |
| Capacity, line of plate | 14.8 cu. yds. struck |

**Construction:** ¼" steel plate shell bottom; ⅜" sides and header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

### OPTIONAL EQUIPMENT

**ENGINE:**

| | |
|---|---|
| Model | NRTO |
| Make & type | Cummins, turbocharged |
| Number of cylinders | Six |
| Bore and stroke | 5½" x 6" |
| Piston displacement, cu. in. | 743 |
| Brake H.P. @ 2100 r.p.m. (gov.) | 335 |
| Max. torque @ 1500 r.p.m. | 900 lb.-ft. |

**TRANSMISSIONS:**
Westinghouse Converter and Mack 4-Speed Transmission. Clutch 2-plate, 17", air actuated.
Allison Torqmatic Converter and Allison Transmission.
Twin Disc Converter and Mack 4-Speed Transmission.

**FRONT AXLE:** Special Heavy-duty, Reversed-Elliott, Drop-Forged I-beam.

**TIRES:**

| | Front |
|---|---|
| Size | 14.00-24 (20P) Rib |

**BODY:**

| | |
|---|---|
| Type | Flared Quarry |
| Make | Heil |
| Capacity, line of plate | 15.2 cu. yds., struck |

**Construction:** ¼" steel plate shell bottom; ½" sides; ⅜" header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

**Body Equipment:** (for std. and opt. bodies): (9) ¾" x 6" alloy wear bars; rock ejectors; horizontal bolsters (3 per side); canopy toe board; rock guards over tires; canopy, loose for export shipment. (for std. body): welded-on side boards; exhaust heating connections.

**CHASSIS EQUIPMENT:** Air starting, Ingersoll-Rand 9HP; Tachograph, Wagner "BB" (24 hour chart 0-3500 r.p.m.) in place of standard Tachometer; Wig-Wag low air pressure indicator; hand control valve to operate rear service brakes; front wheel brake limiting valve; 25,000 B.T.U. hot water cab heater with defrosters; windshield fan mounted on windshield header; hub-odometer; engine chrome cylinder liners and stellite inlet valve seats; insulating dash mat; fender to bumper treads; air operated radiator shutter; air operated Thermo-controlled radiator fan hub; speedometer; back-up light; hydraulic jack, 30-ton; spare rims.

# MACK LRSW

**capacity: 30 tons**

Powered by either a 300 or 335-horsepower engine, this 30-ton, six-wheel dumper has what it takes for off-highway operation in mines, quarries and earth-moving projects. Smooth application of power to its balanced, four-wheel drive bogie is obtained by an air-assisted clutch and overgear transmission with two-speed compound or torque converter.

Convenient location of controls, angle steering column, hydraulic steering booster, and extreme left driver position give easy and efficient handling. Best materials, precision manufacture, and specially engineered components make the LRSW capable of withstanding the toughest 'round-the-clock hauling.

## CONDENSED SPECIFICATIONS

### STANDARD EQUIPMENT

**DIMENSIONS:**

| | |
|---|---|
| Wheelbase | 16' 10" |
| Platform | 14' 11½" |
| Overall Width | 11' 2⅛" |
| Overall Height | 11' 6½" |
| Overall Length | 29' 2¼" |
| Overall Height (Body Raised) | 24' 10" |
| Turning Circle Diam. (To outside edge of tire) | 78' |
| Weight (chassis, body & hoist) | 60,000 lbs. |
| Payload | 60,000 lbs. |

**ENGINE (Diesel):**

| | |
|---|---|
| Model | NHRBIS |
| Make | Cummins |
| Type | Supercharged |
| Number of cylinders | 6 |
| Bore and stroke | 5⅛" x 6" |
| Piston displacement, cu. in. | 743 |
| Brake horsepower @ 2100 r.p.m. (gov.) | 300 |
| Max. torque @ 1500 r.p.m. | 818 lb.-ft. |

**CLUTCH:**

| | |
|---|---|
| Type | Mack two-plate, dry |
| Area of engagement, sq. in. | 416 |
| Actuation | Manual, with air assist |

**ELECTRICAL SYSTEM:**

| | |
|---|---|
| Voltage and capacity | 12 V., 50 Amp. with 24 V., starting |

**TRANSMISSION:**

| | |
|---|---|
| Type | Mack two-lever, Duplex |
| No. of speeds, forward | Eight |
| reverse | Two |

**FRONT AXLE:**

Type . . . . Mack Reversed-Elliott, drop-forged I-beam

**BOGIE:**

| | |
|---|---|
| Make | Mack Planidrive |
| Final drive, type | Four-wheel, planetary |
| Inter-axle differential, type | Mack concentric cam and plunger Power Divider |
| Carriers | Mack Dual Reduction |
| Total Ratio | 18.18 |

**BRAKES:**

| | |
|---|---|
| Type and actuation | Internal expanding, inclosed, air |
| Front, size | 17¼" x 5" x ¾" |
| Rear, size | 20" x 7" x ¾" |
| Hand, size | 12" x 5" x ⅜" |

**FRAME:**

| | |
|---|---|
| Type | I-beam, wide flange |
| Material | Alloy steel |
| Side-members, size | 13 15/16" x 8" with ⅝" web and top flange, ⅞" bottom flange |
| Section modulus | 84.5 per rail |

**SPRINGS:**

| | |
|---|---|
| Type, front | Semi-elliptic |
| rear | Semi-elliptic, inverted |
| Suspension, Mack | Rubber Shock Insulators |

**SHOCK ABSORBERS, FRONT:**

Type . . . . Houdaille, hydraulic

| TIRES (Lug): | Front | Rear |
|---|---|---|
| Size | 14.00-24 (20P) | 16.00-25 (20P) |

**WHEELS** . . . . Cast, spoke

**STEERING GEAR:**

Power steering assist . . . Vickers hydraulic booster

**CAB:**

Type . . Heavy-duty off-highway, closed, all-steel, welded. Offset 10¼" to left of chassis center-line provides clear vision for driver to rear.

**CHASSIS EQUIPMENT:** Hubodometer; screen type radiator guard; front and rear tow pins; air horn; rear view mirror, left side; exhaust through hood with in-line muffler; channel type front bumper; door in hood side for access to oil filler and dip stick; insulating dash mat; wig-wag low air pressure indicator; windshield wipers; stop and tail light; back up light; rim lug wrench and handle; automatic radiator shutters.

**HOIST:**

| | |
|---|---|
| Make | Heil |

Type Twin, double-acting, 10" diameter, hydraulic cylinders with 40" stroke, 70° dumping angle with power return.

**BODY:**

| | |
|---|---|
| Make and type | Heil, Rock-scoop end |
| Capacity, line of plate | 21 cu. yds. |

**Construction:** ¼" steel plate shell bottom; ⅜" sides and header; ¾" slope section; ⅜" alloy wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

### OPTIONAL EQUIPMENT

**ENGINE:**

| | |
|---|---|
| Make and model | Cummins, NRTO |
| Number of cylinders | Six |
| Bore and stroke | 5⅛" x 6" |
| Piston Displacement cu. in. | 743 |
| Brake horsepower @ 2100 r.p.m. (gov.) | 335 |
| Max. torque @ 1500 r.p.m. | 900 lb.-ft. |
| Turbocharger | Turbine, exhaust driven |

**TRANSMISSIONS:**

Westinghouse Converter and Mack 4-Speed Transmission. Clutch—2-plate, 17", air actuated.
Allison Torqmatic Converter and Allison Transmission.

**WHEELS, TIRES:**

| | |
|---|---|
| Front & rear Wheels, type | Cast spoke |
| Tires, size | 16.00-25 |
| Ply-rating, front | 20 or 24 |
| rear | 24 |

**BODY EQUIPMENT:** (9) ¾" x 6" alloy wear bars; 1" alloy wear plate; rock ejectors; horizontal bolsters (4 per side); twin body prop; rock guards over tires; exhaust heating connections; canopy, loose (for export shipment).

**CHASSIS EQUIPMENT:** Air starting, Ingersoll-Rand 9HP; chrome cylinder liners and stellite inlet valve seats; air operated Thermo-controlled radiator fan hub; Tachograph, Wagner model "BB" (24 hour chart 0-3500 RPM) in place of standard Tachometer; speedometer; front wheel brake limiting valve; alcohol vaporizer; cab insulated; exhaust outlet under cab suitable for attachment to body for body heating; 25,000 B.T.U. hot water cab heater with defrosters; solex glass for windshield; windshield fan mounted on windshield header; fender to bumper steel treads; two stop-tail lights; 20-ton hydraulic jack; spare rim.

**MACK — FIRST**

# MACK LRVSW

**capacity: 34 tons**

The 34-ton rated capacity of this super-payload, six-wheel dumper assures minimum haulage costs for the big earth-moving jobs. Equipped with a 400-horsepower engine, four-speed overgear transmission, hydraulic torque converter or two-speed compound, and a balanced, four-wheel drive bogie, LRVSW's can negotiate severe grades fully loaded. Maneuverability and ease of handling are facilitated by such features as a hydraulic steering booster and air-assisted clutch. Heat-treated, stress-proportioned, single-unit frame gives the structural stamina needed to withstand severest operating conditions. All these features, and many more, contribute to unmatched durability and minimum haulage costs.

## CONDENSED SPECIFICATIONS

### STANDARD EQUIPMENT

**DIMENSIONS:**

| | |
|---|---|
| Wheelbase | 16′ 10″ |
| Platform | 14′ 11½″ |
| Overall Width | 11′ 2⅜″ |
| Overall Height | 11′ 7⅛″ |
| Overall Length | 31′ 3⅛″ |
| Overall Height (Body Raised) | 25′ 2″ |
| Turning Circle Diameter (To outside edge of tire) | 78′ |
| Weight (chassis, body & hoist) | 68,000 lbs. |
| Payload | 68,000 lbs. |

**ENGINE (Diesel):**

| | |
|---|---|
| Model | NVH-1200 |
| Make | Cummins |
| Type | Naturally aspirated |
| Number of cylinders | 12 |
| Bore and stroke | 5⅛″ x 6″ |
| Piston displacement, cu. in. | 1486 |
| Brake horsepower @ 2100 r.p.m. (gov.) | 400 |
| Max. torque @ 1200 r.p.m. | 1,075 lb.-ft. |
| Fuel tank and location | 150 gal., back of cab |

**CLUTCH:**

| | |
|---|---|
| Make | Lipe Rollway |
| Type | Two-plate, dry |
| Area of engagement, sq. in. | 571 |
| Actuation | Air |

**ELECTRICAL SYSTEM:**

| | |
|---|---|
| Voltage and capacity | 12 V., 75 Amp. |
| Generator, make and type | Leece-Neville, alternator |

**STARTING SYSTEM:**

| | |
|---|---|
| Starting motor, type | Air |
| Make | Bendix-Westinghouse |
| Rating, horsepower | 25 |
| Cold starting aid | Ether injection |

**TRANSMISSION:**

| | |
|---|---|
| Type | Mack selective constant mesh |
| No. of speeds, forward | Four |
| reverse | One |

**TORQUE CONVERTER:**

| | |
|---|---|
| Model | Westinghouse 18″ |
| Type | Single stage, hydraulic |

**FRONT AXLE:**
Type . . . . Mack Reversed-Elliott, drop-forged I-beam

**BOGIE:**

| | |
|---|---|
| Make | Mack Planidrive |
| Final drive, type | Four wheel, planetary |
| Inter-axle Differential | Mack concentric cam and plunger type Power Divider |
| Carriers | Mack Dual Reduction |
| Total ratio | 18.18 |

**BRAKES:**

| | |
|---|---|
| Type and actuation | Internal expanding, inclosed, air |
| Front, size | 17¼″ x 5″ x ¾″ |
| Rear, size | 20″ x 7″ x ¾″ |
| Hand, size | 12″ x 5″ x ⅛″ |

**FRAME:**

| | |
|---|---|
| Type | I-beam, wide flange |
| Material | Alloy steel |
| Side-members, size | Depth 14¼″, flange width 8″, flange thickness 1″ |
| Section modulus | 130.0 per side |

**SPRINGS:**

| | |
|---|---|
| Type | Semi-elliptic |
| Suspension, Mack | Rubber Shock Insulators |

**SHOCK ABSORBERS, FRONT:**
Type . . . . Houdaille, hydraulic

**TIRES (Lug) Front and Rear:**
Size . . . . 16.00-25 (20P)

**WHEELS:**
Type . . . . Cast, spoke

**STEERING GEAR:**

| | |
|---|---|
| Type | Worm and roller |
| Power steering assist | Vickers hydraulic booster |

**CAB:**
Type . . Heavy-duty off-highway, closed, all-steel, welded. Offset 10¾″ to left of chassis centerline provides clear vision for driver to rear.

**CHASSIS EQUIPMENT:** Screen type radiator guard; hubodometer; front and rear tow pins; air horn; rear view mirror, left side; dual exhaust through hood with inline mufflers; channel type front bumper; rim lug wrench and handle; door in hood side for access to oil filler and dip stick; insulating dash mat; windshield wipers; stop and tail light; back up light; automatic radiator shutters.

**HOIST:**

| | |
|---|---|
| Make & Type | Heil, twin, double-acting, outboard mounted, four-section telescopic cylinder assembly directly connected to body and chassis through a universal joint arrangement to provide maximum flexibility. |
| Dumping angle | 70° |

**BODY:**

| | |
|---|---|
| Make & Type | Heil Rock, scoop end |
| Capacity, line of plate | 24 cu. yds. struck |

**Construction:** ¼″ steel plate shell bottom; ⅜″ sides and header; ¼″ alloy wear and side bevel plates; ½″ front slope plate; ¼″ canopy. 3″ x 7.1 lb. channels between floor plates either side of a 2″ edge-grain hardwood middle section filler

### OPTIONAL EQUIPMENT

**TRANSMISSION (In place of 4-Speed and Westinghouse Converter):**

| | |
|---|---|
| Make & Type | Mack Two-Lever, Duplex |
| Speeds Forward | 8 |
| Speeds Reverse | 2 |

**TIRES (Lug) Front and Rear:**
Size . . . . 16.00-25 (24P)

**BODY EQUIPMENT:** (9) ¾″ x 6″ wear bars over standard ¼″ alloy wear plate; 1″ alloy wear plate in place of ¼″ alloy wear plate; exhaust heating; rock ejectors; rock guards over tires; twin body prop; horizontal bolsters (5 per side).

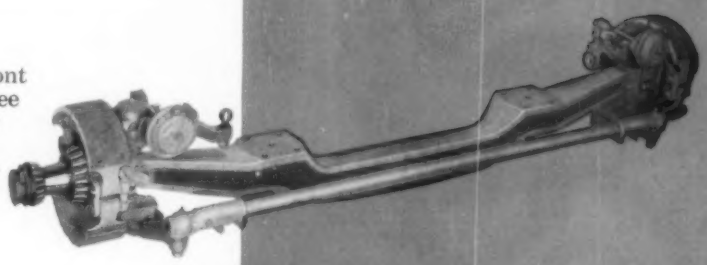
**CHASSIS EQUIPMENT:** Air operated Thermo-controlled radiator fan hub; Tachograph, Wagner model "⊞" (24 hour chart 0-3500RPM) in place of standard Tachometer; speedometer; front wheel brake limiting valve; alcohol vaporizer; 25,000 B.T.U. hot water cab heater with defrosters; solex glass for windshield; windshield fan mounted on windshield header; fender to bumper steel treads; cab insulated; two stop-tail lights; spare rim; 20-ton hydraulic jack.

**NAME FOR TRUCKS**

# only MACK gives you features like these...

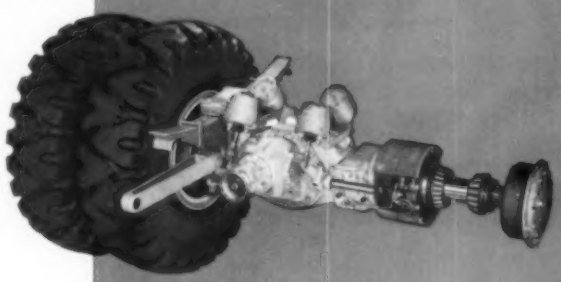
### MACK-BUILT FRONT AXLES

Mack's reversed Elliott, drop-forged I-beam front axles are made extra strong for long, trouble-free service. Extensive use of heat-treated steels for crucial parts means minimum maintenance. Straight tie rod and rugged construction of air-actuated brake shoes insure top performance.



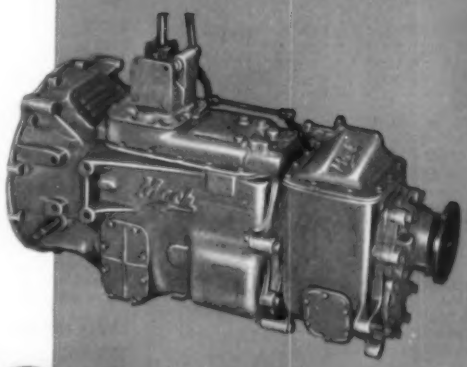
### MACK-BUILT 2-WHEEL REAR AXLES

Mack's two-wheel, rear axle assemblies have an unmatched reputation for durability under strenuous service. The strongest, most wear-resistant materials are used throughout. Dual Reduction, gear-type differential and Mack's famous planetary gear reduction at the wheel hubs (Planidrive) provide the smooth distribution of power needed for top truck performance. Planetary gears can be serviced or repaired without removing tires or disturbing wheel bearing adjustment.



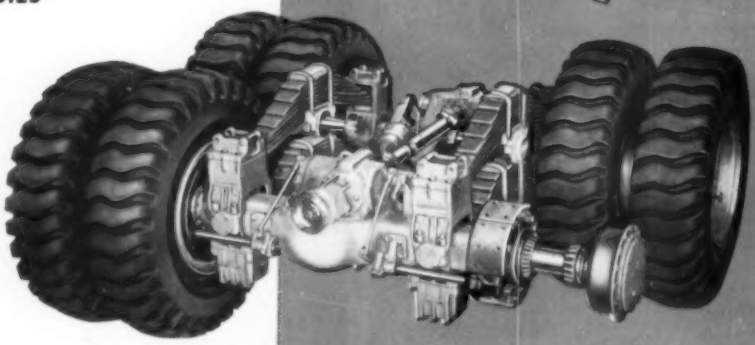
### MACK-BUILT TRANSMISSIONS

Dependable performance and long life are standard in Mack transmissions. Shown here is the heavy-duty overgear transmission used for the LRVSW, LRSW, and LVX off-highway dumpers. The four-speed main transmission and two-speed compound are assembled as a unit to give eight forward and two reverse speeds. The four-speed main transmission without the two-speed compound is offered in combination with torque converter. All gears use Mack tetrapoid or quadrapoid tooth design and are drop-forged and case-hardened . . . gears noted for lasting the life of the truck.



### MACK-BUILT 4-WHEEL BALANCED BOGIES WITH EXCLUSIVE POWER DIVIDER

Under the worst conditions of mud, loose gravel, or difficult terrain, you get maximum pulling power with Mack's four-wheel drive Balanced Bogies because exclusive Mack Power Dividers apply power to the wheels with traction. Planidrive final reduction gears in all four hubs provide needed reduction without excessively large carriers, differentials, or axle shafts. Maintenance is reduced to a minimum.



## MACK first name for TRUCKS

**Mack Trucks, Inc., Plainfield, New Jersey • In Canada: Mack Trucks of Canada, Ltd.**

• General Portland Cement Company's $15,000,000 plant under construction west of Miami, Fla., is scheduled to be ready for production early next year. Main construction material being used is prestressed concrete. The annual output of the plant will total 2,500,000 bbl. A saving of 60 cents a barrel on cement as a result of the elimination of freight rates, will be a local economic factor. The Austin Company of Cleveland, Ohio, has the construction contract.

### Lime Stabilization School Sponsored by N.L.A.

The National Lime Association will hold its first Short Course Training School on lime stabilization for member company representatives on September 24 and 25 at the Mayflower Hotel, Washington, D. C.

Robert S. Boynton, general manager, and Conard M. Kelley, highway engineer will be in charge of the school's program which will include basic fundamentals of soil engineering and stabilization, construction procedures, and applications for lime stabilization. The rapidly growing use of hydrated lime in road base construction was the reason for conducting the school.

---

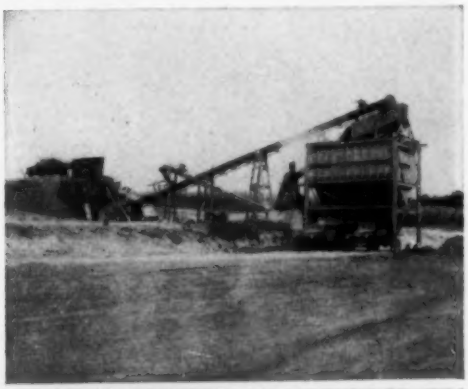
Compania de Cementos Coro of Venezuela announced that its plant at Chichiriviche in the state of Falcon will begin operations soon with a daily production output of 12,000 bags of cement. Cost of installations at the plant is reported to be about $6,300,000.


SINCE 1885—GRUENDLER QUALITY THE BEST THAT MONEY CAN BUY

# Gruendler Stationary Quarry Plants

## BIG PRODUCERS!

Your opportunity! Modernize Now for the large Highway Program! Cruendler Quarry Equipment includes Primary Jaw Crusher or Impact Crusher and Apron Feeder—Conveyor to Screen—Vibrating or Revolving Screen, Secondary Roll Crusher, Hammermill or Jaw Crusher—Return Conveyor to Main Conveyor and Steel Bins for various size aggregates with all Drives and Chutes. Gruendler dependable Plants are extra sturdy in construction with long experience behind them, assuring most economical operation. Complete equipment available for your Plant to produce upwards to 2,000 tons daily if desired.



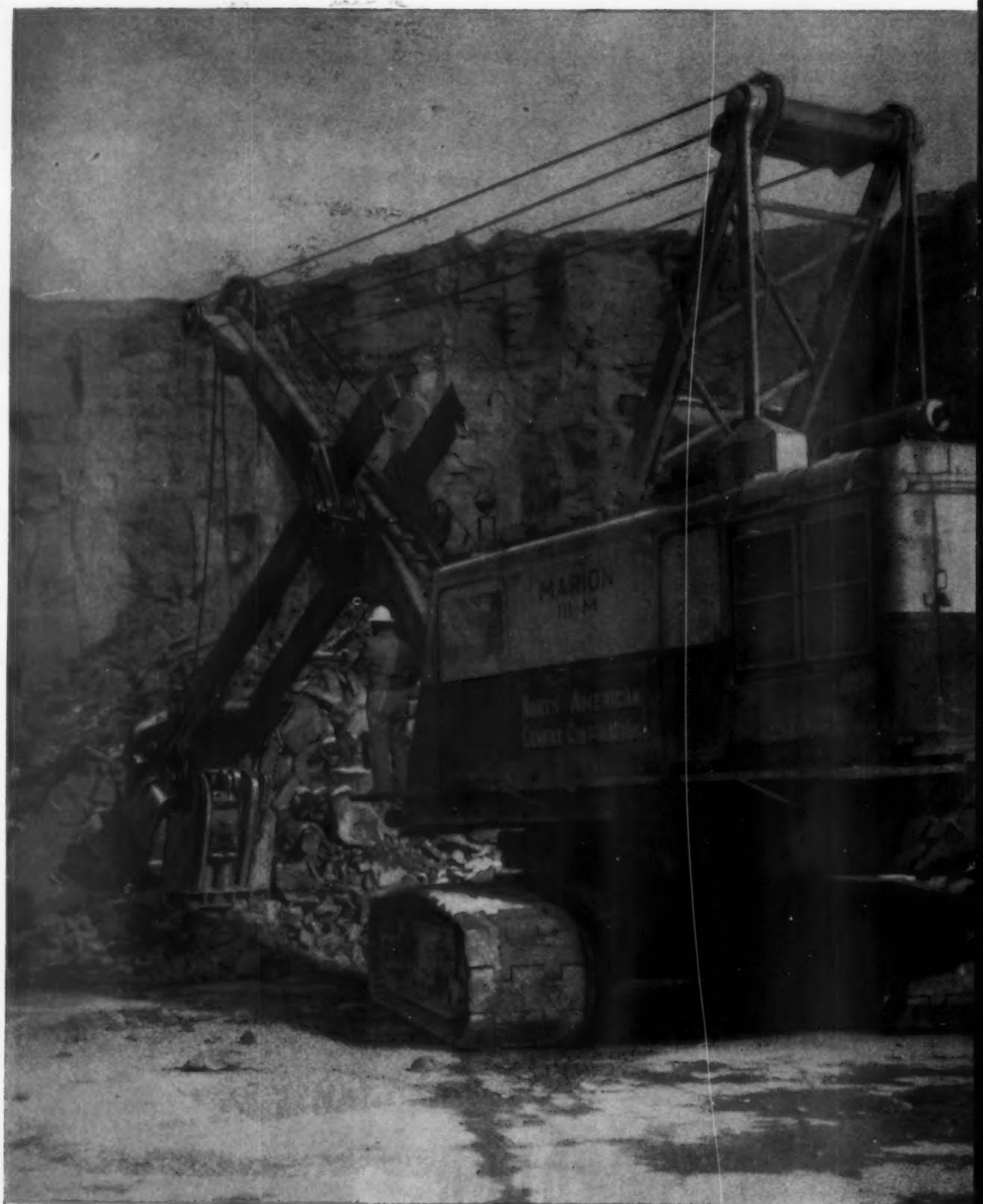
Aggregate and Ag-Stone Plant in Illinois with Gruendler Jaw Crusher and Hammermill Combination.

Aggregate and Ag-Stone Plant in Missouri with Gruendler Crushers and Equipment.

Write for Bulletin: ROCK and GRAVEL OPERATION.

# GRUENDLER

GRUENDLER CRUSHER & PULVERIZER CO.
2915 N. Market St. Dept. P.Q.957 St. Louis 6, Mo. U.S.A.




At North American Cement Corporation, Howe's Cave, N.Y., this giant Marion power shovel keeps working, with fewer overhauls, on Gulf Dieselect fuel and Gulflube Motor Oil H.D. Chain drives on the shovel are protected by Gulf Paragon. Gulfcrest oil is used to lubricate the air compressors.

# North American Cement Corporation gets top equipment performance with Gulf Quality Fuels and Lubricants

To keep equipment operating smoothly and efficiently, North American Cement Corporation depends on Gulf quality fuels and lubricants.

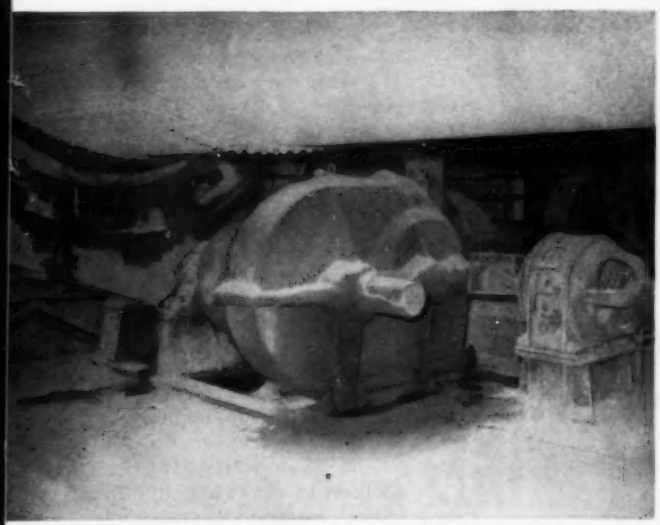
For maximum performance from their power shovels, this firm uses the perfect combination: Gulf Dieselect fuel and Gulflube Motor Oil H.D.

Gulf Dieselect burns clean to cut costly downtime. It reduces valve sticking, helps prevent harmful deposits in fuel systems and injectors. It burns evenly and completely, provides top engine performance.

Gulflube H.D. provides superior lubrication. It keeps rings clean and free . . . aids in getting better compression . . . lasts longer and cuts maintenance costs.

North American Cement Corporation also uses Gulf Lubcote on open spur gears, Gulf Paragon on chain drives, Gulflex A on pressure bearing fittings, Gulf E.P. 95 on eccentric drive shafts on their crushers.

Are you entirely satisfied with the performance of *your* equipment . . . and expense for maintenance? Call the Gulf Sales Engineer for practical help. He's at your nearest Gulf office.



Reduction gears for rotary kilns are protected with Gulf Harmony 97. Gulf quality fuels and lubricants mean fewer mechanical delays, lower maintenance costs.

**GULF OIL CORPORATION**
1822 Gulf Building, Pittsburgh 30, Pa.

GULF

**THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS**

# Sentinels of Safety Awards Announced for 1956 Contest

The Department of the Interior has announced that top honors have been awarded six mines and quarries in Alabama, Pennsylvania, Michigan, and Minnesota for the best safety records in their groups during the 32nd Bureau of Mines National Safety Competition.

Of the 525 mineral-producing operations in 43 states competing in the 1956 contest, 200 went through the year without a disabling injury.

"It is most commendable that these injury-free mines and quarries operated a total of more than 20,000,000 man-hours last year," Secretary Fred A. Seaton said.

Each of the competition winners will receive bronze "Sentinels of Safety" trophies donated by the *Explosives Engineer Magazine*. They are as follows:

The Bell limestone mine, Warner Company, Bellefonte Div., Bellefonte, Pa. (Nonmetallic mines—underground).

Alpena limestone quarry, Wyandotte Chemicals Corp., Alpena, Mich. (Quarries).

Buck iron-ore mine, Pickands Mather & Co. (The Verona Mining Co.), Caspian, Mich. (Metal mines—underground).

Embarrass iron-ore mine, Pickands Mather & Co. (Lake Mining Co.), Biwabik, Minn. (Open-pit mines).

Edgewater mine, Tennessee Coal & Iron Div., U. S. Steel Corp., Wylam, Ala. (Bituminous coal mines—underground).

Goodspring mine, The Panag Coal Co., Goodspring, Pa. (Anthracite mines—underground).

The Bell limestone mine worked 277,540 man-hours without a disabling injury. This operation entered every national contest since the first in 1925. It has received honorable mention six times, and won a trophy in the 1955 contest.

The Alpena limestone quarry worked 474,228 man-hours without a disabling injury. The Alpena Quarry has been enrolled in the National Safety Competition for 16 of the 32 years. It won twice before—in 1943 and 1953.

The mines and quarries established the lowest injury-frequency rate recorded in the 32-year history of the competition, according to Marlin J. Ankeny, director of the Bureau of Mines. The 1956 frequency rate was 18.980 men injured per 1,000,000 man-hours of exposure, compared with the previous year's record-low rate of 19.424. The injury-severity rate of 4.974 per 1,000 man-hours was not as favorable as the record-low rate of 3.872, established in the 1955 competition. However, it was the fourth-lowest in contest history.

Perfect safety records were established by 200, or 38 percent of the 525 mines and quarries participating in the 1956 National Safety Competition. No-lost-time records were reported in the following groups: anthracite, 1; bituminous coal, 6; metal, 8; nonmetallic, 16; open-pit, 38; and quarry, 131.

In addition to the bronze trophy, each contest winner will receive a green and white "Sentinels of Safety" flag, also donated by the *Explosives Engineer Magazine*. Both

(*Continued on page 47.*)

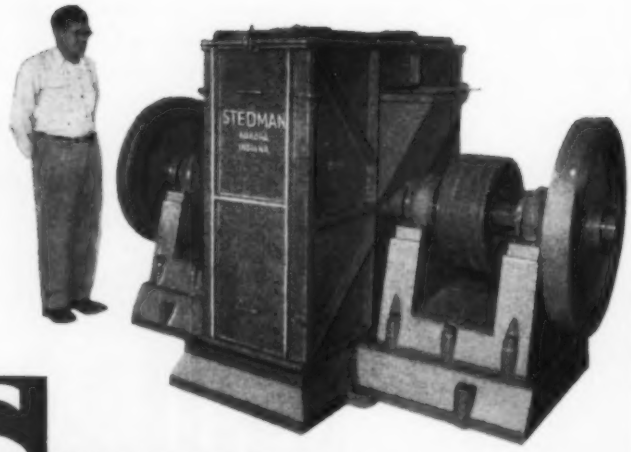
ARE YOUR STONE AND GRAVEL PRODUCTS CUBICAL IN SHAPE?

ARE THEY FREE OF SOFT STONE AND CLAY?

WILL THEY MEET SPECIFICATIONS AND PASS ABRASION TESTS?

DO YOU NEED MORE OF THE FINER SIZES IN YOUR SAND PRODUCTS?

CAN YOU MEET TODAY'S SPECIFICATIONS ON AG LIME?

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SOLVES MOST OF THESE PROBLEMS!

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STEDMAN FOUNDRY AND MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
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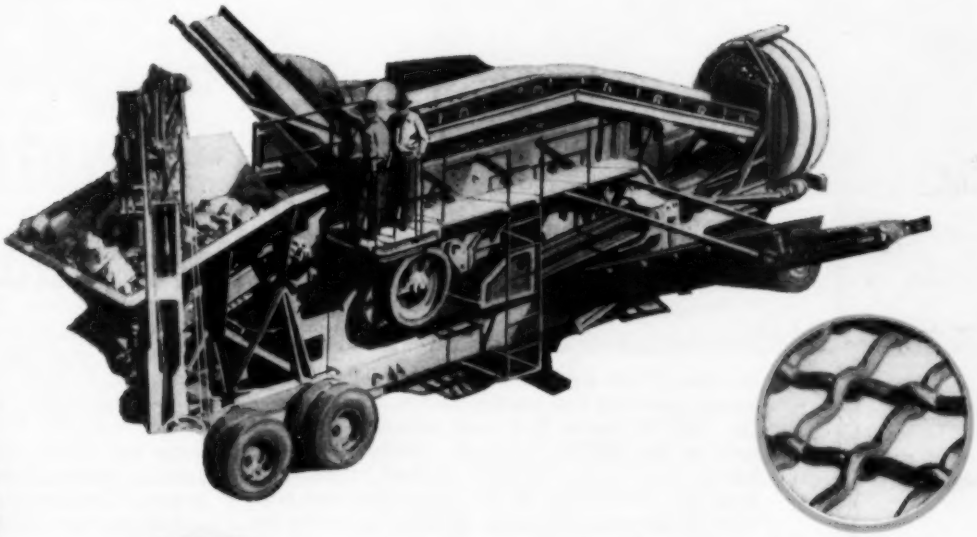
The beating that many modern highways and buildings must take is unbelievable. That's why builders are always careful to make sure that only top-quality materials go into their projects... why so many of them use aggregate that has been sized through accurate and long-lived CF&I Industrial Screens.

For CF&I Screens quickly, efficiently and accurately size the aggregate that goes into concrete. Why are they so accurate? The answer is quality—quality that's built into them during every stage of their production.

Whether you're preparing aggregate for superhighways... or supermarkets... or any other application... you'll find that CF&I Industrial Screens can help you. Get the complete details today by contacting the nearest sales office listed below.



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5100

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# Extensive Research Program Precedes New Gear Motor Line

AT a press showing and plant tour held at Paterson, N. J., on July 25, the Gear Motor and Transmissions Components Department of the General Electric Company announced and displayed a new line of integral horsepower gear motors and the facilities with which these new units are being manufactured.

According to company spokesmen, the new line of power transmission equipment is the culmination of more than five years of both market study and technical research on use and production factors. Howard W. Bennett, marketing manager of the department, indicated that development of this equipment was actually initiated in 1953, following an exhaustive survey of industry directed toward ascertaining current and future product requirements as affected by the growth of automation.

The all-motor gear motor shown here being set up in a belt conveyor drive installation is one item in a new line of power transmission equipment that includes an integral type, as well as a separate helical speed reducer.

This study led to the establishment of the firm's new department, which was brought into existence for the production of "shelf goods" power transmission units, as opposed to the former manufacture and distribution of this equipment as specialized products.

Designed in anticipation of increasing need for compact and versatile speed reduction, the new line will be offered in three basic components: an integral-type in which gear and drive motor are packaged into a single unit; an all-motor type featuring the drive motor coupled to the gear reducer and mounted on a common carrier; and a separate helical speed reducer which may be used with various prime movers.

Among the major objectives stated to be prime factors in the development of these units were maximum flexibility in mounting and ease of conversion, maximum standardization and interchangeability of component parts, simplicity of design, and minimum size consistent with reliability and service life.

Ease of maintenance was described as receiving special attention by D. F. Wild, manager, design engineering. Most servicing operations, it was said, can be performed from the motor end of the gear housing without removing the gear housing from the mounting base.

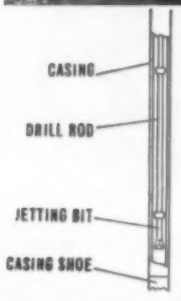
Another new feature is a built-in provision for making ratio changes as needed. This is accomplished through a change of pinion and gear in the first stage only. Gear and bearing alignments are machined into the units, thus permitting disassembly and reassembly without loss of alignments.

(*Continued on page 47.*)


*What's down there?*

**Empire TEST DRILLS come up with the RIGHT ANSWERS**

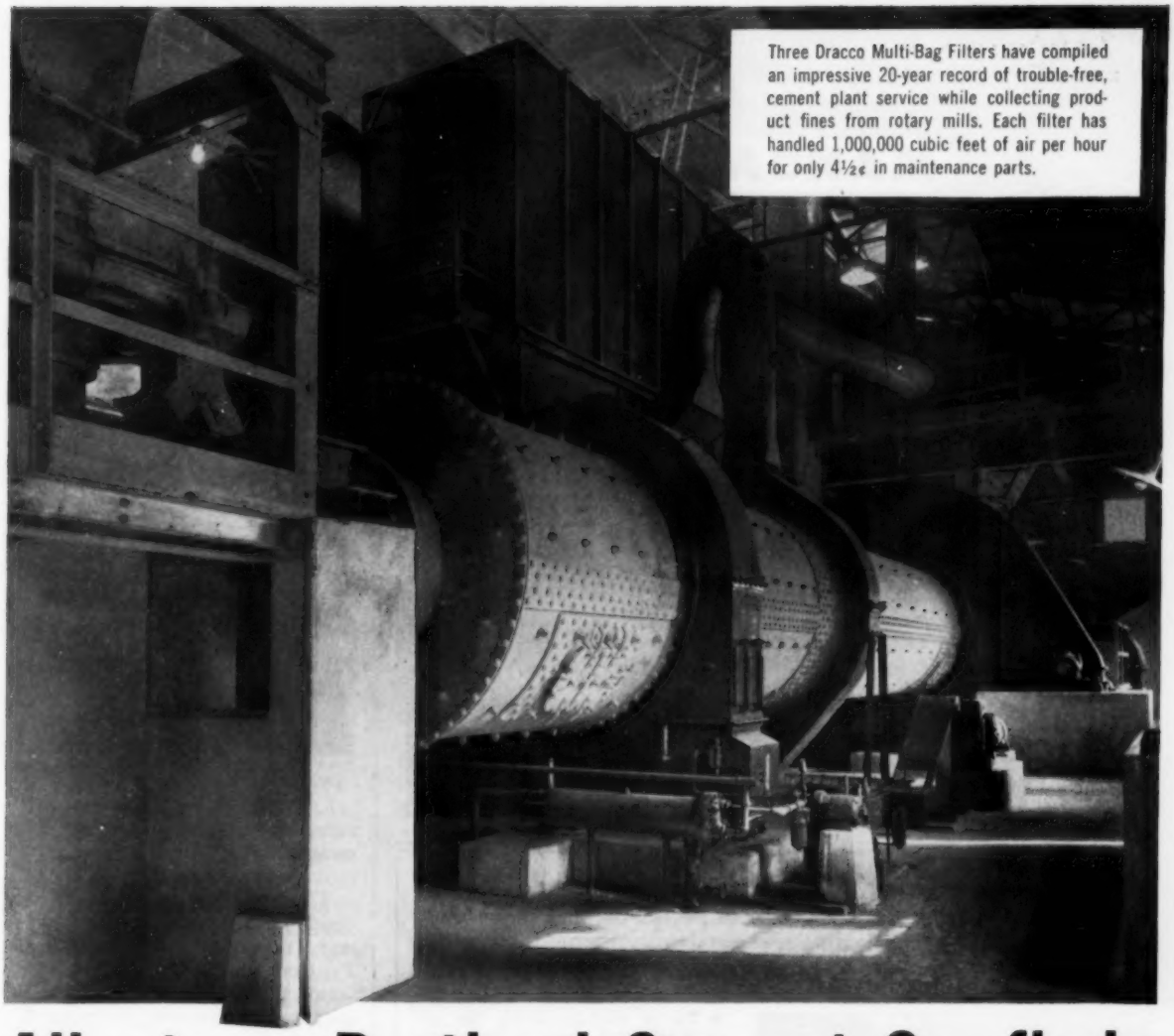
**EMPIRE Hydraulic Testing Drill**




This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

***Write TODAY for complete details***

**NEW YORK ENGINEERING CO.** 75 WEST STREET NEW YORK 4, N. Y.



Three Dracco Multi-Bag Filters have compiled an impressive 20-year record of trouble-free, cement plant service while collecting product fines from rotary mills. Each filter has handled 1,000,000 cubic feet of air per hour for only 4½¢ in maintenance parts.

# Allentown Portland Cement Co. finds Dracco filters cost less to maintain

Maintenance economy is an important advantage of Dracco Dust Filters. Cost records on many installations prove that Dracco systems last longer with less servicing.

A typical example is the three Dracco Multi-Bag Filters installed 20 years ago at the Allentown Portland Cement Co., Evansville, Pa. to recover product fines from clinker grinding operations. Total replacement parts including filter bags during this period have been $5,425—an annual cost of only $90 per filter!

Operated continuously, the filters today are in excellent condition with many years of service remaining.

Outstanding maintenance records like this result from Dracco units which are engineered for easy, low-cost inspection, repair and parts replacement. Dracco's simplified design uses a minimum number of easily accessible moving parts. Filter bags can be quickly changed on the clean-air side. Extra-heavy construction assures a long, dependable service life with minimum downtime.

Maintenance cost-savings are another reason why it makes sense to specify Dracco Dust Control Equipment—there's a unit to solve almost every industrial dust or fume problem. Experienced Dracco engineers will be glad to supply further information or technical assistance.

**DRACCO CORPORATION**

**4050 East 116th Street · Cleveland 5, Ohio**

*Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.*

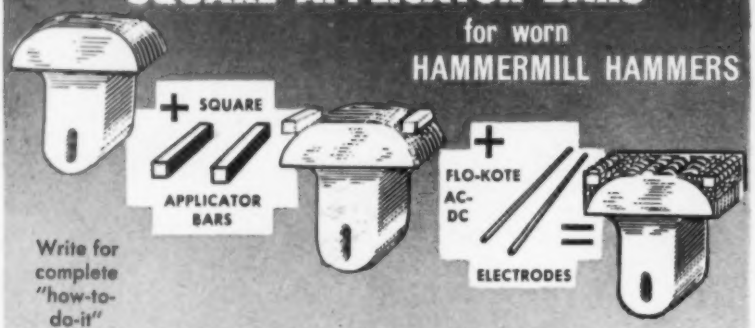
**DRACCO** *airstream* conveyors
dust control equipment

A SUBSIDIARY OF FULLER COMPANY GENERAL

gets tougher and tougher
under severe impact and abrasion . . .

MANGANAL
T.M. Reg. U.S. Pat. Off.

11%-13½% MANGANESE-NICKEL STEEL
SQUARE APPLICATOR BARS
for worn
HAMMERMILL HAMMERS




Write for complete "how-to-do-it" details.

- Outlast new parts — cost less.
- Easier application — less down time.
- Polish to slick finish — less friction wear.

NATIONAL WELDING SUPPLY ASSOCIATION MEMBER
SOLE PRODUCERS

For Best Results Use MANGANAL WELDING ELECTRODES

STULZ-SICKLES CO.
PORT AVENUE at JULIA ST. ELIZABETH, NEW JERSEY

NEAREST DISTRIBUTOR UPON REQUEST

These DURACLONE Twins Save 14 T.P.H. of Fine Sand

- To a fast-growing list of DURACLONE users in the sand-and-gravel industry, add the name of Mickelson Bros., Oxford, Mich.

- Disturbed because their conventional sand classifier was losing a high volume of valuable fines in the waste overflow, the Mickelsons ordered two 30-in. rubber-lined DURACLONES from the Detroit distributor, Marens-Fader Equip. Co., and had them installed as pictured.

- Handling 2400 g.p.m. from the classifier overflow via two RU 6-in. pumps, recovery of clean, fine sand (formerly flumed away to waste) now *averages 14 tons per hour!*

- Get the facts about DURACLONE and its performance guarantee today! Mention volume of your overflow water when you write.

H. B. LARGE ENGINEERING CO.
262 S. PARKWOOD AVE. PASADENA, CALIF.

## Water Supply & Treatment Issued in Eighth Edition—Edited by M. L. Riehl

The National Lime Association has published the eighth revised, enlarged edition of *Water Supply and Treatment* which is reportedly the most widely used book on water treatment in the world. Over 50,000 have been printed.

Merrill L. Riehl

The new 221-page edition is now entitled *Hoover's Water Supply and Treatment*, in honor of Charles P. Hoover, internationally known water plant chemist, who was the author of the first seven editions. Mr. Hoover, also referred to as the dean of the water works chemists, died in 1951, soon after he prepared the seventh edition.

Merrill L. Riehl, the new author, is a former protege of Mr. Hoover. He is presently superintendent of purification and chief chemist of the Mahoning Valley Sanitary District, Youngstown, Ohio. In addition, Mr. Riehl serves as a consultant for water, sewage, and trade waste treatment plants in Ohio and the Middle West.

After receiving his degree in chemical engineering from Ohio State University, Mr. Riehl worked closely with Mr. Hoover in the Columbus water department as engineer of design. Later he became chief chemist, Ohio Department of Health, Division of Laboratories. He also taught sanitary engineering subjects at Case Institute of Technology.

Mr. Riehl has made extensive

(*Continued on page 47.*)

## Sentinels of Safety

(*From page* 42)

awards are retained for a year, then returned for presentation to the winner of the next competition. Each employee and official at the winning operations, receives a "Certificate of Accomplishment in Safety" from the Bureau of Mines.

The Bureau also awards Certificates of Achievement in Safety to the 164 mines and quarries that were second, third, fourth, and fifth, and to all injury-free operations that worked 30,000 or more man-hours during the contest year.

Any domestic mine or quarry is eligible to enter the National Safety Competition. Contest rules and applications can be obtained from the Branch of Accident Analysis, Division of Safety, Bureau of Mines, United States Department of the Interior, Washington 25, D. C.

## GE Research Program

(*From page* 44)

Flexibility of mounting designed into the new line permits floor, wall, or ceiling mounting without external shifting of components or internal changes. Additional provision for field adaptation to extreme positions is available by means of an oil level kit.

The equipment will be offered in three basic types of speed reductions: single reduction offset shaft in ranges from 780 to 350 r.p.m.; double reduction concentric shaft for speeds from 350 to 37 r.p.m.; and triple reduction concentric shaft for speeds from 30 to 13.5 r.p.m.

Development of the new line is being accompanied by revisions and modernization of the production facilities at Paterson. Over $1,000,000 has already been spent for machine tools alone. Improvement of assembly lines, machine arrangements, tooling, and processing has been related to the advantages of the new power transmission designs.

Typical of the markets in which the new units are expected to find wide distribution are materials handling, pumping, mixing and agitating, fan drives, etc. The gear-motor market in total is estimated to be approximately $70,000,000.

Introduction by General Electric of these gear-motor and speed reducer lines is regarded by company officials as the most important event in the firm's participation in this field since 1930. Ratings of the three new types of units described above, which will be released on October 1, are 1 to 10 hp. By February 1, 1958, the line will be completed through 30 hp., and by July next year, it is planned that helical speed reducers and all-motor gear motors will be available in a 1- to 75-hp. range.

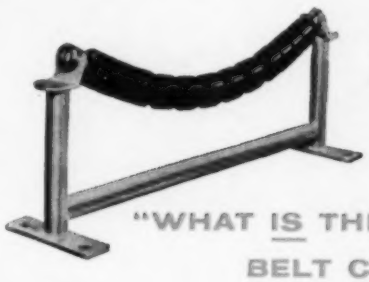
## Water Supply

(*From page* 46)

revisions and additions in preparing the 8th edition. A chapter on fluoridation of water supplies has been added, and the chlorination section has been expanded to include new chlorination equipment. Latest methods for determining hardness, calcium and magnesium content, bacteria, and calcium carbonate stability were also included. In addition, revisions were made covering disposal and reclamation of water softening sludge, recarbonation, taste and odors, and silica removal with dolomitic lime.

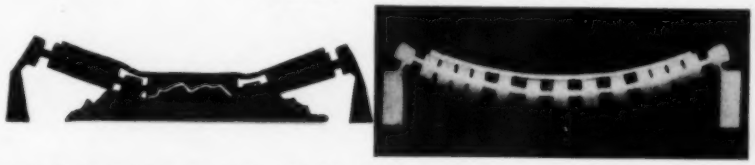
This book has become a reference and supplementary text for sanitary engineering courses in most universities and for use in industrial and municipal water treatment plants.

This new edition may be obtained from the National Lime Association, Washington 5, D. C., at $2 per copy, plus 12 cents postage.

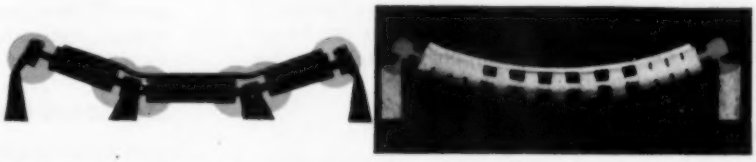
We've been asked...

"WHAT IS THE JOY LIMBEROLLER BELT CONVEYOR IDLER?"



**Radically different from all other idlers,** the Limberoller is a flexible steel cable suspended between two bearings . . . neoprene discs are molded to the cable . . . forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning . . . prevents material buildup, a source of trouble with conventional idlers.

**Supports the belt throughout its entire width** . . . doesn't have the unsupported gaps left between the rolls like conventional idlers. Increases belt life 20% and more. Materials don't "bump along" from idler to idler, either.



**Two bearings, instead of six.** They are up out of the dirt zone, not hiding down under the belt. Joy has never replaced a single bearing due to normal failure. Heard enough? There's more . . . get the whole story from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WSW L6831-160 **Write for free bulletin 160-26**

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HOISTS • ELECTRIC PLUGS, RECEPTACLES AND POWER DISTRIBUTION SYSTEMS

*Power shovel breaks down . . .*

# So quarry moves boulders with

**All over the country, more and more dirtmovers are finding Michigan Tractor Shovels can effectively handle jobs once considered much too tough for rubber-tired equipment.**

**You've probably read about—or seen—Michigans digging pit-run gravel. Or breaking out reinforced concrete. Or clearing brush. Now here's another dramatic application.**

## Maintains pit production

The company involved, a large northeastern firm, had always had trouble maintaining pit production when any of their big power shovels broke down. One time this happened, they had a Michigan Tractor Shovel in the pit on demonstration. They decided to put it through the rugged test of rock loading.

## Now own six Michigans

That was in 1954. Today, this company owns *six Michigan Tractor Shovels!* In emergencies these units effectively handle both rock loading and cleanup. They also handle *all* truck-loading of screened aggregates and other products of the multi-million-ton crushed stone plant. Management estimates their output "definitely greater" than output of loaders formerly used. Maintenance costs, over periods ranging up to three years, have been "satisfactorily low".

## Boulders weigh up to 7 tons each

Note the photos. Above, one of the company's five 2¾ yard Michigan Model 175A's is moving huge boulders to stockpile for later sale as rip-rap. Each chunk weighs ½ to 7 tons . . . yet at no time has operator reported trouble handling them. Upper right, another Model 175A loads shot rock at the quarry face. Michigans' unobstructed dumping height, power shift, and power steer helps speed both emergency assignments.

## Load 10 tons in 2 to 3 minutes

Stockpile loading (lower right) keeps the company's

This is the type of shot rock that must be loaded into trucks for transport to crushers. Michigan Tractor Shovels must be able to take a lot of punishment—and they do!

A full bucket every time saves trips, cuts handling costs of loading crushed stone or sand. This load weighed out at 7,000 lbs. This model Michigan can lift 15,000 lbs.

# 2¾ yard Michigan

2 yard Model 125A and most of the 2¾ yard Model 175A's busy most of the time. Good mobility and unexcelled breakout, *equally great* through the entire lifting arc, make quick work of this job. The Model 125A needs only 3 minutes to heap a typical 10 yard truck . . . the bigger Model 175A's require only 2 to 2½ minutes.

## 24 mph travel speeds odd jobs

Michigan speed pays off on odd jobs, too. Like cleanup of haul roads, stockpiles, and around crushers. Pushing loaded trucks up grade. Setting utility poles. Hoisting crusher screens and other heavy equipment. Switching railroad cars (up to 25 empties at once). Plowing and removing snow. Despite year-around work averaging 50 hours a week, company officials report "downtime negligible." And continuing, "The all-Clark-built, all-matched power train sure boosts efficiency. From power shift, power steer and 3-to-1 torque converter to planetary wheel drive axles . . . our '54 model has the same components as our newest rig . . . which certainly proves how good the Clark design is. We like the speed of loading . . . the speed between job sites . . . the excellent performance on emergency rock-handling . . . the lack of downtime . . . the ease of maintenance. That's why we've been repeat-buyers five times!"

## Make your own test

A demonstration, gladly arranged by your local Michigan Distributor, will show you why you too should be a Michigan Tractor Shovel buyer. Put the demonstrator on your toughest loading jobs . . . we'll bet *our cost* of the demonstration *against your time* you'll really be *enthusiastic* about the results.

Michigan is a registered trade-mark of

CLARK® EQUIPMENT

**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**
**2479 Pipestone Road**
**Benton Harbor 42, Michigan**
**In Canada: Canadian Clark, Ltd., St. Thomas, Ontario**

## Bombay Cement Interests Report Record Run Of Facility at Kymore

According to word from the Associated Cement Companies, Bombay, the No. 4 kiln at the Kymore plant recently completed a total uninterrupted run of 612 days, which is a record for India—perhaps even a world record, considering that the refractory lining consisted of only 45 to 50 percent of alumina bricks.

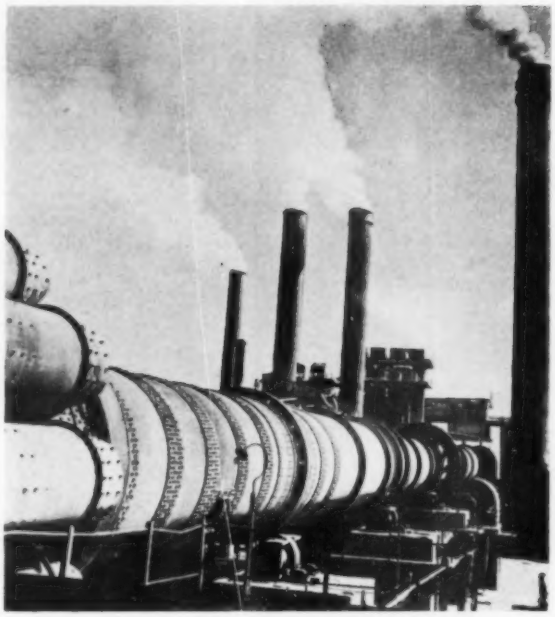
The kiln in question was fabricated in the Associated Cement Companies central workshop at Shahabad in 1948 and put into commission in January, 1949. The following data may be of interest to our readers:

| | |
|---|---|
| Type of kiln: | Wet process rotary kiln with integral coolers (A.C.C. make) |
| Size of kiln: | 3- by 2.7- by 3- m. dia. by 113.8m. long (9.8- by 8.8- by 9.8- ft. dia. by 373.3 ft. long) |
| Type of Brick Lining used in the Burning Zone: | 6-in. circle bricks of A.C.C. make, with alumina content of 45 to 50 percent. |
| Total run of of kiln: | 612 days (uninterrupted) |
| Total Clinker Production: | 1,89,980 long tons |
| Type of fuel: | Pulverized coal |
| Raw materials employed: | Sedimentary : limestone and quarry overburden |
| Slurry Water Content: | 35.0/35.5 percent |
| Compound Composition of Clinker: | $C_3S$ ..... 43.63<br>$C_2S$ ..... 30.64<br>$C_3A$ ..... 9.45<br>$C_4AF$ ..... 10.33 |
| Lime saturation factor | = 0.88 |
| Silica modulus | = 2.44 |

The Associated Cement Companies are the largest cement producers in India having 15 plants in India and 2 in Pakistan. Total production exceeds 3,250,000 tons. This company has expansion plans for increasing this capacity to 5,500,000 tons by 1961.

## Nigel Tomlin of B.C. Cement Retires From Presidency

Nigel Tomlin, president and general manager of the B. C. Cement Company, Ltd., has relinquished the presidency for health reasons, and will retire from service soon.



The No. 4 kiln at the Kymore cement plant of the Associated Cement Companies in India, which recently completed a total uninterrupted run of 612 days.

Gordon Farrell, a director of the company for 14 years, has been elected president in his place.

Mr. Tomlin, who has been with the company for 15 years, has been president and general manager for 13 years.

## U.S. Lime Sales for April Show Slight Increase

Domestic sales of open-market lime in April (763,567 short tons) increased slightly over the previous month's output, according to reports by producers to the U. S. Bureau of Mines. Lime for agricultural, building, and chemical uses increased. Refractory lime uses decreased slightly.

The accompanying table shows sales by types and major uses.

**Lime Sold by Producers[1] in the United States in Specified periods of 1956-57, by Types and Major Uses, in Short Tons**

| | MARCH | APRIL | | JANUARY-APRIL | |
|---|---|---|---|---|---|
| | 1957 | 1957 | 1956 | 1957 | 1956 |
| By types: | | | | | |
| Quicklime | 598,737 | 598,965 | 644,973 | 2,425,554 | 2,516132 |
| Hydrated lime | 154,878 | 164,602 | 163,300 | 584,403 | 615,685 |
| Total lime [2] | 753,615 | 763,567 | 808,273 | 3,009,957 | 3,131,817 |
| By uses: | | | | | |
| Agricultural: | | | | | |
| Quicklime | 5,449 | 7,796 | 8,894 | 16,102 | 19,678 |
| Hydrated lime | 19,377 | 22,638 | 22,617 | 58,117 | 57,008 |
| Total lime | 24,826 | 30434 | 31,511 | 74,219 | 76,686 |
| Building: | | | | | |
| Quicklime | 10,879 | 16,460 | 14,556 | 47,794 | 54,190 |
| Hydrated lime | 70,377 | 77,135 | 86,475 | 270,461 | 300,125 |
| Total lime | 81,256 | 93,595 | 101,031 | 318,255 | 354,315 |
| Chemical and other Industrial: | | | | | |
| Quicklime | 384,104 | 387,716 | 405,991 | 1,560,582 | 1,583,611 |
| Hydrated lime | 65,124 | 64,829 | 54,208 | 255,825 | 258,552 |
| Total lime | 449,228 | 452,545 | 460,199 | 1,816,407 | 1,842,163 |
| Refractory (dead-burned dolomite) | 198,305 | 186,993 | 215,532 | 801,076 | 858,653 |

[1] Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

[2] Approximately 60 percent of lime produced is high-calcium and 40 percent high-magnesium.

*If any of your work is in sandy soil, you well know all the maintenance tracks need. This New Jersey company figured they spent $22,000 in parts alone every year. So they switched to rubber, now*

# SAVE BIG REPAIR BILLS, GET MORE WORK DONE!

Bennett Sand & Gravel Company, Manasquan, New Jersey, qualify as *real experts* on track wear. All their work is in gravel or high-silica sand, which forms the floor of their 1,000 acre quarry. In the past, they figured re-bushing and new sprockets were needed on each of their crawler-dozers twice a year. Complete sets of rails had to be replaced every eight months. Rebuilding jobs on three crawler dozers cost over $22,000 per year *in parts alone*. Shop time for the track repairs totalled *400 to 500 man-hours per year*. To eliminate this high cost, Bennett decided to try rubber. Their local Michigan Distributor heard about it, got permission to demonstrate a Model 180 Tractor Dozer. Bennett management liked it so well, they insisted it stay right on the job.

## "Tires don't wear out"

The Michigan started to work in summer, 1956. To date, the tires show virtually no wear. Paul Bennett, Jr., Company Vice President, says he expects them to "last indefinitely." For comparison, he points to a tractor loader which has worked constantly and still has original tires after 6 years. A bottom-dump hauler has original treads after 9 years. So, Bennett figures, the tires on their Michigan dozer, with its steerable wheels, should be good for thousands of hours. The machine does everything, too . . .

## Spread at 6 scattered dumps

Its regular jobs include:

1. Keeping three big sand dumps pushed off. Types of sand: mason, concrete and coarse grade. Job was once tried by another make of rubber-tire dozer, but it bogged down hopelessly in the often-wet sand.
2. Spreading truck-dumped gravel at three dumps: pea-size, ⅜" and 1" stone. Major advantage in this operation is way Michigan's low-pressure tires don't crush the gravel . . . a real problem with crawlers when selling gravel for state work.
3. Cleaning spillage from haul roads.
4. Cleaning around washer.
5. Building roads at secondary pit five miles away. Unit gets to this assignment *under its own power* at 27 mph.

## "Easier to run than crawlers"

"We do about 50 kinds of odd jobs, as well," says John Gifford, a dozer operator with Bennett *since 1940*. "The Michigan is a pleasure to run all the time. Hit a good-sized stone while driving a crawler, for instance, and you really get a jar. In our Michigan, you roll right over it, stay in perfect control. It's a cinch to operate the Michigan after running a crawler—and a lot faster too. *Michigan gets around the plant as fast as a truck*, handling dozens of jobs—doing well at all of them!"

## Available on lease-purchase

If slow speeds and sand-in-the-tracks are grinding away at your profits, it will pay you to get full facts on this Dozer. Your local Michigan Distributor will be glad to arrange a trial demonstration—*you* pick the job. You *needn't* keep the Michigan we demonstrate . . . but we guarantee if you have any work in sandy soil, or any scattered odd jobs, you'll be tempted. All sorts of purchase plans can be arranged . . . including no-money-down, pay-as-you-profit lease-purchase.

Michigan is a registered trade-mark of

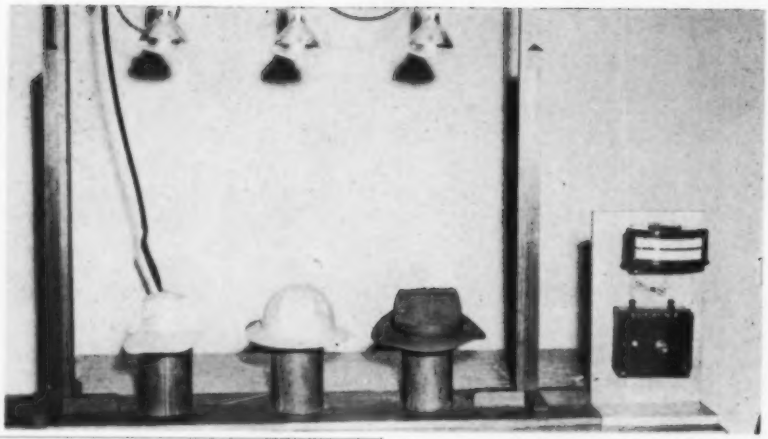
**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**
**2479 Pipestone Road**
**Benton Harbor 36, Michigan**
**In Canada: Canadian Clark, Ltd.**
**St. Thomas, Ontario**

**CLARK® EQUIPMENT**

## Hard Hats Are Not Hot—According to Scientific Test Put on by Standard Oil

Are hard hats hotter than caps or felt hats in summer? An interesting test was run by the Standard Oil Company of Indiana last year.

The demonstration consisted of the application and measurement of heat on a hard hat and on two types of head coverings commonly worn by employees. The source of heat, in each case, was a 250-watt heat lamp, suspended above the hats, which were mounted on wooden heads! Thermocouples were attached to the top and inside of each hat, and readings were obtained on a galvanometer.



Three types of headgear having their temperature taken.

Readings observed were as follows:

| | Outside | Inside |
|---|---|---|
| Cap | 112 deg. | 110 deg. |
| Felt hat | 112 deg. | 108 deg. |
| Hard hat | 110 deg. | 88 deg. |

Q.E.D.—complaints that hard hats are too "hot" to wear in summer are groundless. In every demonstration the hard hat proved to be much cooler than the other types.

## Nazareth Cement Company Files $1,500,000 Lawsuit

A civil suit in the amount of $1,500,000 has been filed agains the Federal Government by the Nazareth Cement Company, in Nazareth, Pa., in an attempt to recover $1,555,989.27 in income and excess profits taxes.

This suit is based upon an interpretation of a provision in the Internal Revenue Code for a depletion allowance on "cement rock" or limestone. Nazareth contends that the allowance should be made on finished cement, not on mined rock.

The revenue code provides an allowance of 15 percent of gross income from the cement rock property in any taxable year, but no more than 50 percent of its net income. Depletion is figured as a tax deduction because the cement rock—a fixed asset—is being used up (depleted) in conjunction with the business.

Nazareth spokesmen claim that there is no market for the rock before it is processed into cement, and that therefore the tax allowance should be computed on the gross income on the cement property. This procedure would make the allowance somewhat larger than under the present method.

**HANDLE ANY WELDING JOB WITH LINCOLN IDEALARC**

BECAUSE IDEALARC OFFERS AC OR DC WELDING CURRENT AT THE FLICK OF A SWITCH

Use it for repairs—shop fabrication—construction—hardsurfacing. Idealarc with its choice of AC or DC current handles every type of electrode and every type of job.

- *Available as an AC or AC/DC welder*
- *Available in 180, 250, 300, 400 and 500 amp. sizes*
- *Operates on single phase power lines*
- *Costs no more than ordinary welders*

***And a Lincoln Electrode for Every Job!***

Lincoln manufactures a complete line of mild steel, alloy steel, and hardsurfacing electrodes. No need to hope for a good weld. Lincoln has the electrode designed to do it best. Bulletins SB-1351 and SB-1352 discuss each electrode in detail. Write for them.

**THE LINCOLN ELECTRIC COMPANY**

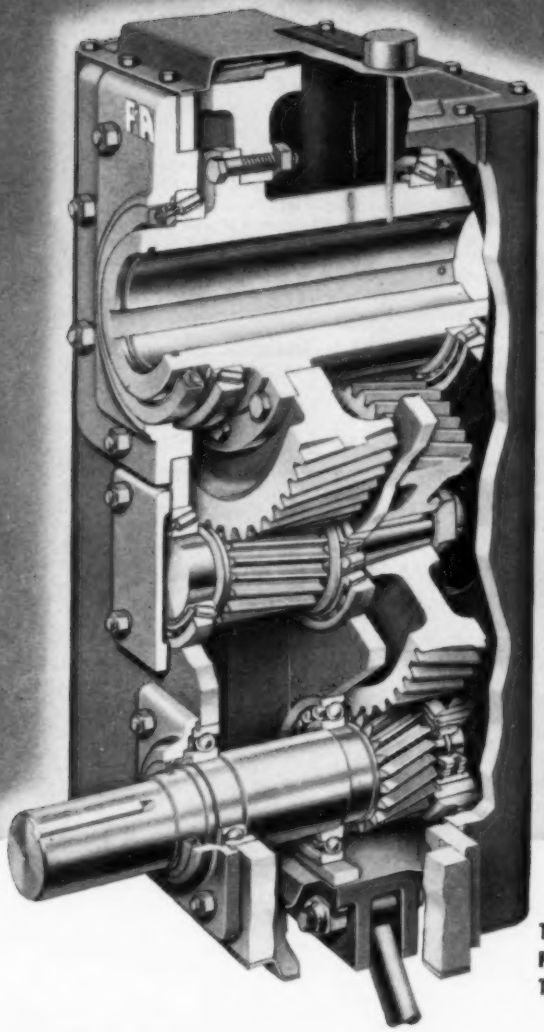
Dept. 5217 • Cleveland 17, Ohio

*The World's Largest Manufacturer of Arc Welding Equipment*

# *New*...LARGER...ALL-STEEL!

# -the FALK 315J Shaft Mounted Drive

- **for higher horsepower**
- **for lower output speeds**



THE NEW 315J...
FROM 2 HP AT 5 RPM
TO 50 HP AT 359 RPM

## *Check These Features*

*New* — 3-wall, one-piece housing provides double the ability of cast iron to withstand external impact or shock loads.

*New* — ratio range—5:1, 14:1 or 25:1. Higher ratio range makes possible lower output speeds...smaller sheaves...standard, rather than slow-speed, motor.

*New* — ease of maintenance. All revolving elements can be easily replaced in the field, on the jobsite! Inspection covers permit quick inspection of gears and bearings. Dipstick provides quick check on lubricant.

*New* — longer center distance between shafts allows use of larger sheave on input shaft. Unit may be mounted with input shaft next to driven machine, and with motor mounted directly under driven shaft.

**PROMPT DELIVERY**

Standard units are available for off-the-shelf shipment from factory, warehouse or distributor stock.

**LET US HELP YOU**

Your Falk Representative or Authorized Falk Distributor will gladly review your applications and offer suggested selections—without obligation.

**Write for Bulletin 7100**

## The new Falk 315J also gives you these famous Falk advantages—

- Falk extra-depth, extra-capacity gear teeth—plus the extra efficiency (98½% per gear mesh) of helical gears for maximum power utilization.
- Through-hollow shaft design for easy installation, with internal groove to permit use of bearing puller when dismounting unit. Hollow shaft also permits use of unit on through-shaft applications.
- Tie rod fastened to steel housing by steel bracket with bolt in double shear. Shock load on tie rod will not damage housing.

**THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN**

**Representatives and Distributors in Most Principal Cities**

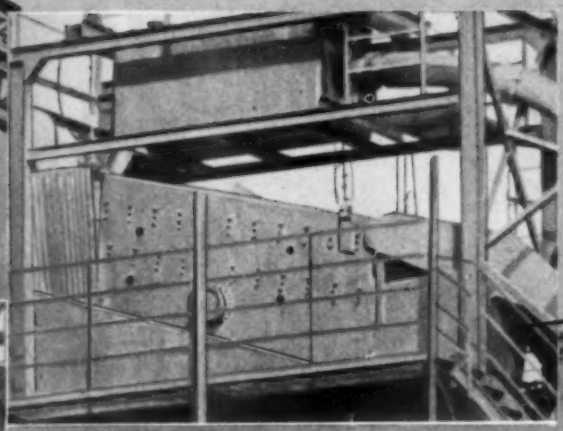
*Manufacturers of Quality Gear Drives and Flexible Shaft Couplings*

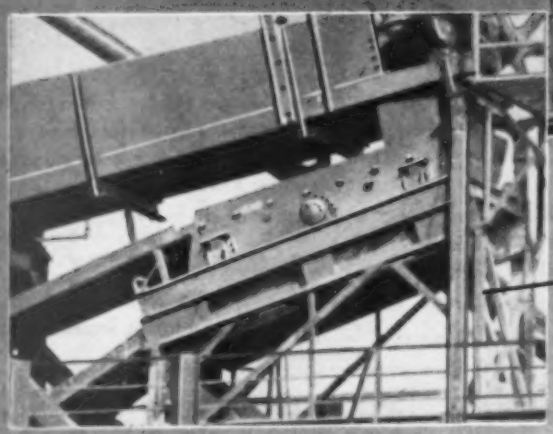
**FALK**

**...a good name in industry**

# FAST, ACCURATE AND SIMPLICITY AGGREGATE

Material received by the pump box drops to the 4' x 12' Model M-11 Simplifo triple deck screen. The top deck is equipped with 2" square openings. The oversize is chuted into a separate bin. Due to the nature of the deposit there is no need for a crusher, and what oversize accumulates is sold for fill uses. The second deck is equipped with a ⅜" sq. opening. This deposit produces a large amount of pea gravel, and the excess which cannot be combined into concrete aggregates is chuted to another bin. All other materials between the first and third decks is passed onto the logwasher where it is thoroughly cleaned.





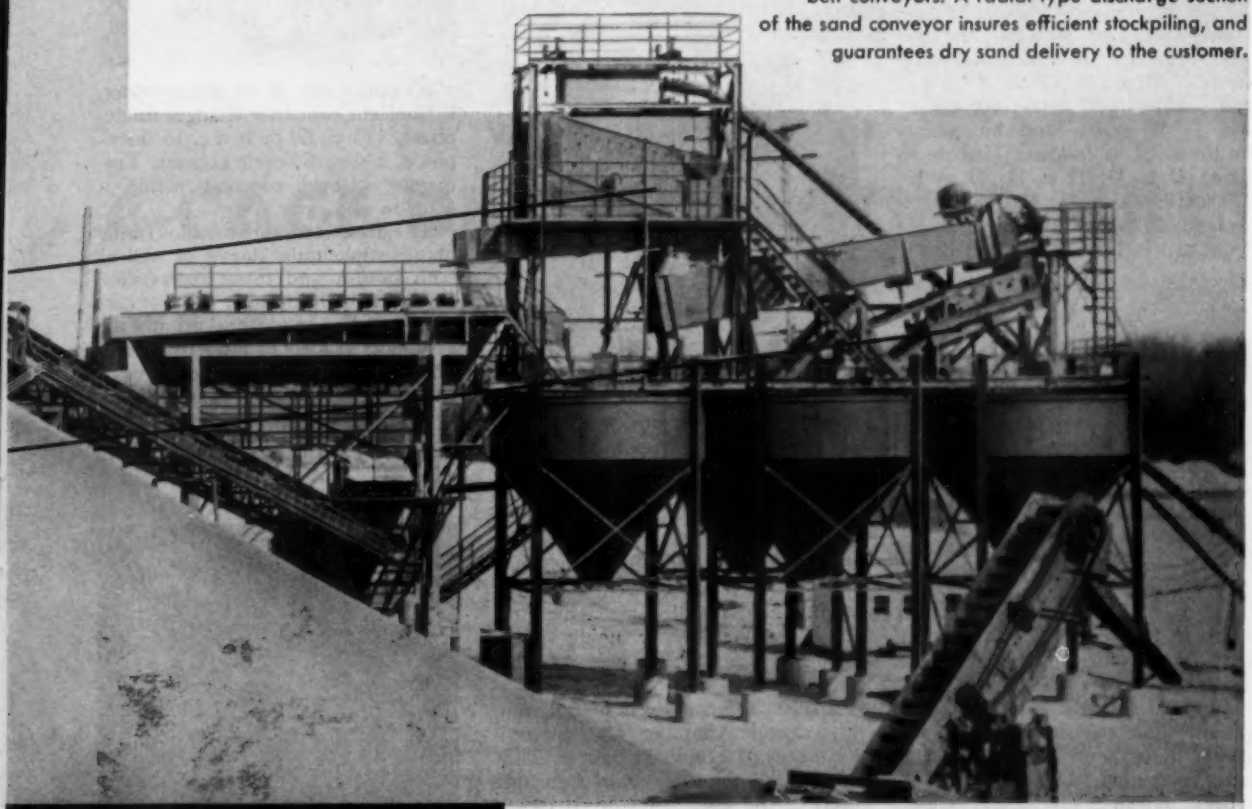
In the final phase of processing aggregates discharge from the logwasher onto a 4' x 8' Model 8G triple deck unit. Here the final rinsing and sizing takes place. The top deck, 1¾" sq. opening, splits the aggregate into two concrete specifications. The second deck openings are used to assist in making any unusual gradations, but primarily to lighten the load on the third deck where small opening screen cloth eliminates the broken soft stone, coal, and slate degradation. • Write today for Catalogs #531 and #571. • SIMPLICITY equipment can increase production in your plant.

**Simplicity**
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND 12, MICHIGAN

# PROFITABLE SIZING WITH SCREENS

**Production—125 tons/hour—with Simplicity equipment at one of the dredging operations of Boichot Concrete Products Corp., Lansing, Michigan—Louis and Donald Boichot, owners.**

Averaging 125 tons hourly—with production peaks as high as 150 t.p.h.—Simplicity screens produce accurately sized aggregates and washed sand at a large dredging operation of the Boichot Concrete Products Corp. of Lansing, Mich. The 8″ pump, equipped with both a 10″ intake and 10″ discharge, delivers material 6″ x 0 to a 4′ x 12′ M-11 triple deck screen. This unit scalps off the oversize stone, and screens all sand through a 3/16″ opening screen cloth. The sized aggregate is passed through a 30′ long twin log-washer, where it is thoroughly cleaned. In turn the aggregate is discharged onto a 4′ x 8′ model BG triple deck screen for rinsing and final sizing. The sand is flumed from the 4′ x 12′ screen to a 32′ long electrically-operated purging tank, where initial dewatering of sand occurs. Sand is then introduced into two sand screw classifiers from the purging tank and passes to a stockpile via belt conveyors. A radial-type discharge section of the sand conveyor insures efficient stockpiling, and guarantees dry sand delivery to the customer.



**SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.**

**FOR CANADA:** Simplicity Materials Handling Limited, Guelph, Ontario.

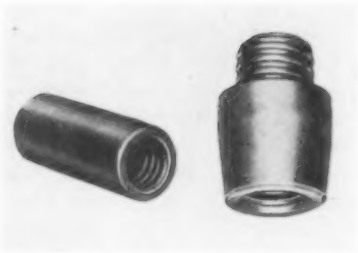
**FOR EXPORT:** Brown and Sites, 50 Church St., New York 7, N.Y.

**Write for new Simplicity Screen Cloth Catalog #67. Tells you all you'll need to know in ordering woven wire screen cloth. Immediate delivery from Simplicity's huge stock of fine quality cloth.**

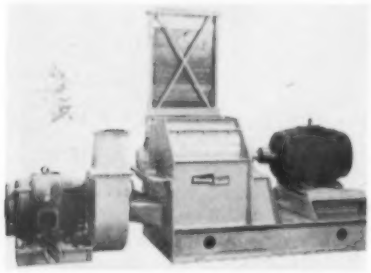
201

# New Machinery
## *and Equipment*

**For Further Information Use Card on Pages 141-142**

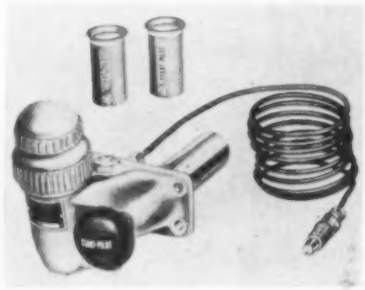


• Among the many blast hole drilling accessories available in the Brunner & Lay Rok-Bit line are bit couplings in the following threads: H; D; K; Type #1; #2; #200 series; 400 series; 600 series; and J-7.50 series—and bit adapters threaded as follows: (female to male) H to D; D to H; D to K; 200 to H; 400 to H; 400 to D; 600 to D; 600 to K; Type #1 to H; Type #2 to D; Type #3 to K. **(51)**



• A new design of heavy duty Hammermill, announced by Strong-Scott Mfg. Co., has specially hardened screens which the manufacturer guarantees to outlive ordinary screens by a factor of five times or more, depending on the material that is being ground. The screen is sectionalized, so in case of wear or breakage, the damage can be repaired by changing only one section (one-sixth of the screen area). The special hardening and the contour of the screen also makes possible greater capacities per horsepower per hour. Another improvement is reversible rotation through a simple electrical switch arrangement, which does away with manual turning of worn hammers. The discharge blower unit operates independently from the grinding mill.

This Strong-Scott Hammermill is designed for custom or production grinding and is furnished in sizes ranging from 40 to 125 hp on the grinding chamber. The entire frame and grinding chamber are constructed of welded, heavy-duty steel. **(52)**



• The Start Pilot Corporation is manufacturing a European-designed diesel engine starting primer and the hermetically sealed multi-start aluminum capsules.

Start Pilot kit consists of the main unit, including the capsule chamber and the hand-operated double action air pump; a spray nozzle which is screwed into the engine inlet manifold; a length of small diameter copper tubing which connects the pump unit to the spray-nozzle.

In use, the capsule is placed into the capsule chamber and pierced by means of a built-in piercer. This allows the fluid to drain into the body of the fluid reservoir chamber.

Start Pilot is said to give instant economical starts at temperatures as low as minus 60 deg. F. It reduces engine wear, increases life of batteries and starting equipment, eliminates all heating equipment, and saves valuable time and costly man hours by starting engines instantly. **(53)**

• Weighing only 39 lb., this compact, lightweight converter changes single-phase, 115-v., 60-cycle a.c. to three-phase, 230-v., 60-cycle current. Frequency is held constant within a fraction of a cycle.

The durable aluminum alloy frame houses capacitator starter as well as both output and input receptacles, and is about 10 in. high without carrying handle. Intake and exhaust air vents are located in lower halves of endbells, making the converter drip-proof. Heavy-duty, grease-sealed ball bearing produce very little noise. **(54)**

• Elwood Engineering Company announces its Elenco front wheel drive designed for increased traction, greater operating efficiency, and reduced slippage. The Elenco driving axle quickly converts a standard tractor into a four-wheel drive unit, adding up to one-third more traction. **(55)**

# PRODUCE MORE FINES!

**WITH OUR *NEW* LINE OF**

# 4-CAGE DISINTEGRATING MILLS

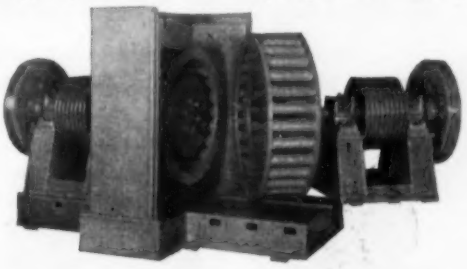
For reduction of limestone, fertilizing compounds, slag, pre-crushed stone, clay, low silica gravel, etc.

**Hard-facing** of pins and side walls is among the features of this Eagle Disintegrator, latest addition to a nearly 25-year-old, distinguished family of pulverizers, crushers, and related equipment.

**Capacities** range from approximately 10 tons per hour on Model 3 to approximately 55 tons per hour on Model 5—three models in all.

**One-piece frame,** electrically welded, assures exceptional strength and stability. High quality, SKF or Torrington, taper-bore bearings, spherical roller type, permit takeup due to wear—an exclusive Eagle feature!

**Quickest access** — when occasion demands it, you can get at and into this Eagle faster than into any comparable model. Remove pin to raise hinged lid, then 6 bolts to remove access side plate —and you're in!



**SPECIAL OFFER EXTENDED**

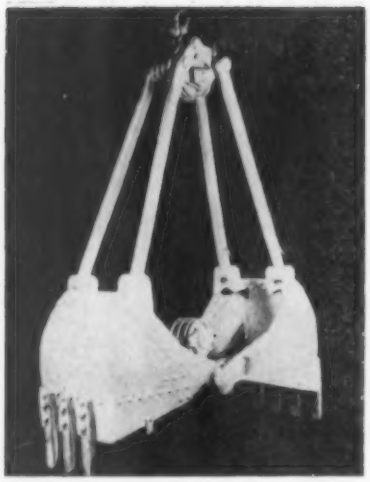
**Send us a sample (200# to 500#) of your pit-run ag-stone, *freight collect,* for Eagle's gradation improvement test. We will put it through an Eagle Cage Mill, make a product report, and ship the resulting ag-lime back to you for your inspection. You're welcome to be on hand when the batch is processed, if you can make it. No obligations of any kind. We are convinced an Eagle mill can make more money for you and want to prove it to your satisfaction!**

*Write for further details—for engineering help with your crusher problem!*

**EAGLE**

JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS

**CRUSHER CO., *Inc.*** GALION OHIO·U·S·A



• A new line of fast release, easy-operating production clam shell buckets has been developed by the Hutton Fabricating Manufacturing Corporation for excavating, dredging, and material handling operations.

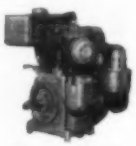
The cutting teeth and cutting lip are forged of T-1 steel, a low-carbon, quenched and tempered alloy plate steel which increases bucket life and reduces downtime for the operator.

The shells and head are of all-welded construction. This integral unit design provides positive alignment of parts. **(56)**

• Model 100-B lifting jack, manufactured by the Buda Division, Allis-Chalmers Manufacturing Company, is rated at 100-tons and has lifting height of 8⅛ in. Suitable for handling extra-heavy loads, the two-speed hydraulic model is useful in the erection of heavy equipment and in machinery moving. The jack is equipped with a tandem pump to permit rapid engagement of the load. The dual release valves in the base can be operated from either side. **(57)**

• 3c carburetors, made by the Century Gas Equipment Company, have been selected as factory standard for International V-Line Trucks equipped with LP-Gas engines. These carburetors are dual throat and 4-barrel down draft types. Ball bearing equipped, they are calibrated and jetted to the performance curve of International V-8 engines. The complete LP-Gas carburetion power package includes a Model M4 Century converter with cast-in coils and built-in lockoff and primer, and a Century Fuelock-Strainer unit. **(58)**


2-cylinder models 10 to 18 hp.



4-cycle single cyl. models, 3 to 9 hp.

• *Load-Holding Lugging Power!* That's what you get when you specify Wisconsin Heavy-Duty Air-Cooled Engines... engineered for HIGH TORQUE performance. Here is power that *hangs* on through the shock loads . . . and *carries on* under either variable or constant-load operating conditions.

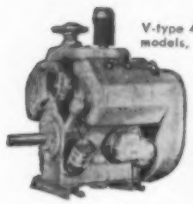
Torque Champs

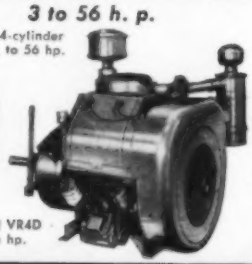
WISCONSIN ENGINES

3 to 56 h. p.

Wisconsin basic HIGH TORQUE design pays off in terms of "Most hp. Hours" of on-the-job heavy-duty service, at all temperatures from low sub-zero to 140° F. Team-up your equipment with Wisconsin HIGH TORQUE Champs—backed by over 2,000 Wisconsin Authorized Service Stations, world-wide. Write for full-line "Spec" Bulletin S-212.

V-type 4-cylinder models, to 56 hp.





New Model VR4D 43 to 56 hp.

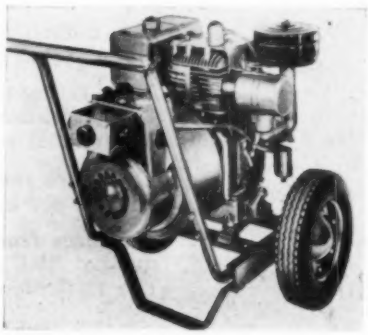
MOST H.P. HOURS

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

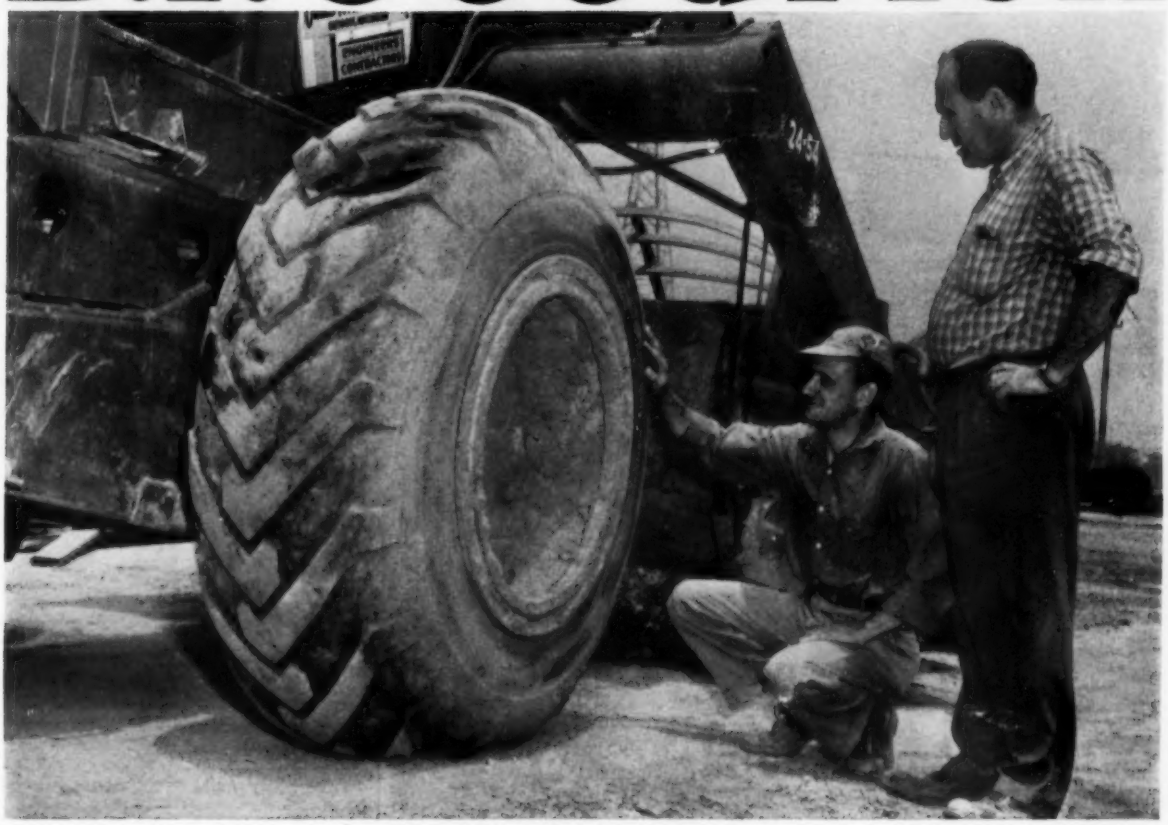
A7-6103-⅓A

• Pioneer Gen-E-Motor Corporation has developed a new electric generator plant. Designed for easy portability, the generator is mounted on a sturdy frame and dolly, is supported by large size rubber-tired wheels, and has a tubular steel hand guide.

Designated the Model BHA-20LD, the generator provides an output of 2,300 watts, 115 volts a.c. and operates at 3,600 r.p.m. Push-button starting is standard with the use of a 12-v. battery. An automatic cutout which prevents overcharging and serious damage to the battery is standard. **(59)**

# B.F.Goodrich



## These tires handle the biggest jobs... give more traction, more wear, more retreads!

MONTH in and month out, in all kinds of weather, Julius Porath and Son Company, Detroit, goes about the rugged job of building roads in southeastern Michigan. 105 vehicles—including trucks, cranes, dozers, graders—work 8 to 10 hours a day, 5 to 6 days a week.

Equipment rolls on soft ground, over rock-strewn roads, often over no roads at all. Unnecessary tire failures could tie up production—skyrocket costs. But not for Porath. They use B.F.Goodrich off-the-road tires, report they are "the best tires for this type of work."

One reason is the B.F.Goodrich FLEX-RITE NYLON cord body. It withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. The FLEX-RITE NYLON body outwears even the extra-thick tread, can still be retreaded *again and again!*

B.F.Goodrich builds off-the-road tires with extra-thick treads designed to bite into the soil for maximum traction. No matter what kind of construction work you do, there's a B.F.Goodrich tire to make your work go faster, and save you money.

Your B.F.Goodrich dealer has a complete line of tires (left), and he offers expert, on-the-job tire service. See him today or write: *B.F.Goodrich Tire Company, A Division of The B.F.Goodrich Company, Akron 18, Ohio.*

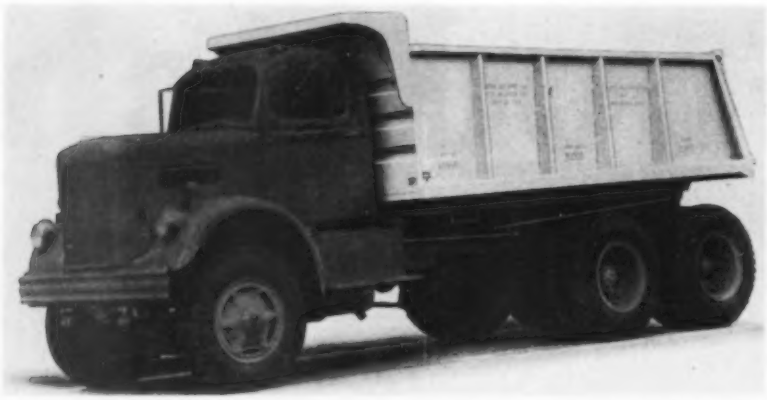
**THERE'S A B.F.GOODRICH TIRE FOR EVERY CONSTRUCTION JOB**

UNIVERSAL | ROCK LOGGER | SUPER TRACTION | TRACTION EARTH MOVER | ROCK SERVICE

**Specify B.F.Goodrich tires when ordering new equipment**

**B.F.Goodrich**
FIRST IN RUBBER

*Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book*



• A "triple-tapered" dump body recently introduced by Jacob Press' Sons, Inc., is wider and higher at the front than the rear and is longer at the bottom than at the top. This new design of body allows for greater load on the front end to take advantage of weight laws in various states, with haulage of sand and gravel particularly in mind. Sides, front, rear and floor are constructed of lightweight high tensile SAE #950 steel. The tailgate control is operated manually from within the cab. A 20-ton twin telescopic hoist is used to raise and lower the body. **(60)**


**DUST** *was a problem*

**50 TONS** of DUST discharged in 24 hrs.

"Headache" for producer of lightweight aggregate.

**Dust Problem Licked!**

**OVER 90%** free of effluent dust

Producer and community both happy!

"SEEING IS BELIEVING"—the above before-and-after views amply prove the efficiency of Southern's new wet type dust collector.

We had a "king size" problem in our own plant, making lightweight aggregates for the building trade. Extreme heat plus corrosive and abrasive action caused a 50,000 c.f.m. offensive effluent from six stacks. Naturally our neighbors complained!

We tried a lot of collectors, but all failed to stand up against the combination of heat, acids and corrosion.

Finally we designed and built our own—it has passed every test for effectiveness and durability in controlling atmospheric pollution.

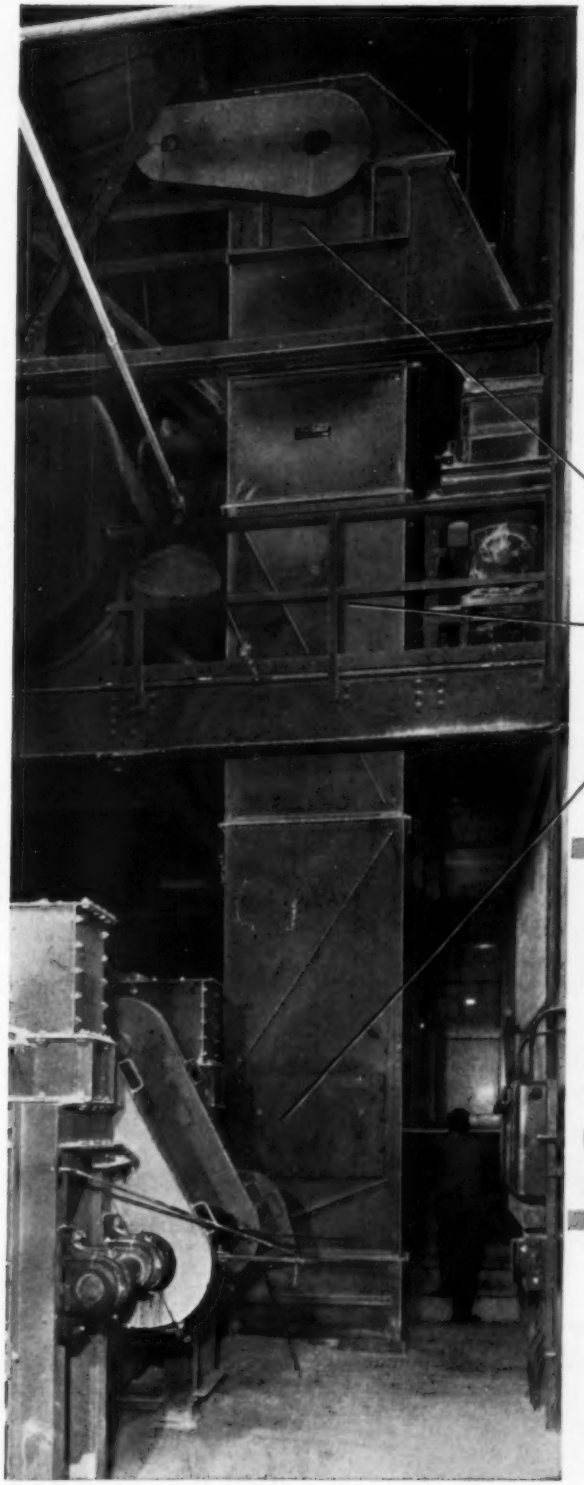
**If you have a similar problem, contact us for full information without obligation.**

**SOUTHERN LIGHTWEIGHT AGGREGATE CORPORATION**
**Process Engineering Division • Box 9138, Richmond 27, Va.**

• Important engineering changes have been made in the Roto-Bin-Dicator, the widely used paddle type device for controlling the level of bulk materials in bins and chutes. The Bin-Dicator Co. states that the changes permit the use of this equipment where operating conditions induce excessive vibration and high stresses on the assembly.

The new Roto-Bin-Dicator is equipped with a re-designed low torque motor and gear reduction unit to drive the slowly rotating paddle that projects into the bin. The flexible shaft on which the paddle is mounted now is comprised of a steel spring encased in molded neoprene and all connections are held securely with rollpins. The operating principle remains the same as before. When material in the bin reaches the paddle, the rotation of the paddle is stopped and the torque exerted by the motor actuates a Micro-switch in the motor housing. When material drops below the paddle, rotation is resumed and the Micro-switch returns to normal position. This equipment is particularly adaptable to use under pressure or vacuum. **(61)**

# Why alignment is built into LINK-BELT bucket elevators *at the factory... not in the field*



## Link-Belt makes and integrates all components to speed assembly

EVER buy a "bargain" bucket elevator—then run into unreasonable installation costs? If so, you'll appreciate the ease with which Link-Belt bucket elevators are assembled. All components are carefully manufactured, assuring ready alignment. And because *Link-Belt makes them all,* they're integrated to match perfectly, operate smoothly.

At your request, Link-Belt will also accept erection responsibility. Particularly important if you're planning a new plant, this service—backed by Link-Belt's unequalled background in bucket elevator engineering—can contribute greatly to assuring over-all efficiency of your system. A Link-Belt representative awaits your call for a consultation.

**HEAD SECTION COMPONENTS** — bearings, head shaft and sprocket or pulley — are chosen from Link-Belt's complete line on the basis of material to be handled and capacity requirements. Chains or belts suitable for all service conditions are available.

**INTERMEDIATE CASING SECTIONS** are fabricated for convenient assembly and assurance of accurate alignment. Casings are self-supporting. Occasional lateral tie-ins may be required where unusually great heights are involved.

**BOOT COMPONENTS** incorporate bearings suitable for adjusting elevator chain or belt to proper tension. Large access door makes routine inspection and adjustments quick and easy.

**BUCKETS** — all types and sizes suitable for handling all kinds of materials are available from stock.

## Designed for maximum elevating efficiency...

**CONTINUOUS DISCHARGE** bucket elevators handle materials ranging from light to heavy and from fines to large lumps. Fixed or adjustable head shaft.

**INCLINED ELEVATORS** handle sand, gravel, stone and other highly abrasive materials. Available in chain or belt type, with or without casing.

**LINK-BELT**

**BUCKET ELEVATORS**

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.803

# Continental

## Self-Aligning
## BELT TRAINING IDLERS

**Troughing**

**. . . and return**

**Designed and built for accurate and positive belt training for ANY material . . . under ALL conditions.**

Incorporating tapered roller bearings with combination labyrinth and contact seals, for long and trouble-free operation under the most rugged conditions. Standard sizes stocked for immediate shipment.

*Call, wire or write your nearest Continental Office*

cg-5718

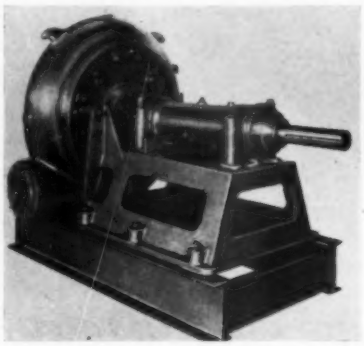
**INDUSTRIAL DIVISION**
**CONTINENTAL GIN COMPANY**
BIRMINGHAM, ALABAMA

CGC ATLANTA CLEVELAND DALLAS KNOXVILLE MEMPHIS MOBILE NEW YORK 17

• A giant wire rope sling, 3 in. in diameter, is offered by the Wire Rope Division, American Chain & Cable Company, Inc. The ACCO line now includes slings in 19 diameters ranging from ¼ in. to the new 3 in. size.

The new sling is furnished with the Dualoc ending, which is said to eliminate tucking and crushing or distortion of the sling body. Breaking strength of the sling is rated at 720,000 lb., with a safe working load of 144,000 lb., or 72 tons. **(62)**

• Model XL dredge pump, manufactured by the Kansas City Hay Press Company, is available in three sizes. The 6 in., 35 cu. yd. per hour model will pass solids up to 4½ in.;

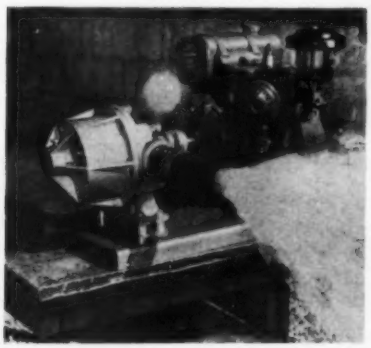


the 8 in., 60 cu. yd. per hour model will pass solids up to 5½ in.; and the 10 in. model with a 90 cu. yd. per hour capacity, is capable of passing solids up to 7½ in.

All Model XL pumps may be obtained with either right- or left-hand drive, with vertical, horizontal, or horizontal overshot discharge. The standard pump is a right-hand horizontal undershot discharge model. All wearing parts exposed to the scouring and pounding action of sand and gravel are made of close-grained, high-chrome, semi-steel castings. **(63)**

• A new positive displacement pump introduced by Hypro Engineering, Inc., has rubber rollers which act as rolling vanes, a design feature which is said to reduce friction.

The new pump, which can be direct coupled to a gear reduced motor



or engine, has 2 in. ports and delivers up to 95 gal. per minute at 700 r.p.m. It is reasonably tolerant to non-abrasive solids entrained in liquid.

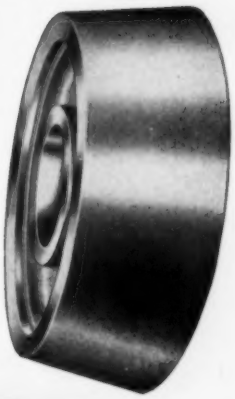
Another feature of the pump is its spring loaded pressure-relief end plate which protects pump and connecting pipe or hose lines from excessive pressures. The pump is reversible, and is self-priming up to 10 ft. above the liquid source. Once primed, it has a suction lift exceeding 20 ft. (64)

• The Johnson-March Corp. has developed a new product called Permaspray, which blankets and protects outdoor storage piles of bulk materials against all types of weather conditions. The new spray is a colloidal suspension in water of a special chemical which hardens to form a tough, flexible, water-resistant film when exposed to air. The deposited film is said to resist the action of wind, rain, frost and heat. It also protects the pile from channeling, often caused by heavy rains, and so prevents washing away of the material.

Since the product has the approximate consistency of water, it can be handled easily in any type of spraying equipment with the exception of very coarse or very fine nozzles.

After the film is applied, it will set within 24 hours under normal climatic conditions. The solution is supplied ready for spraying in 55-gal. steel drums, and applied at the rate of one gallon of spray to 100 square feet of surface. This mixture is said to provide effective protection for one or more years. (65)


FARRELL-CHEEK Special ROLLERS



"TAILOR-MADE" FOR YOUR SPECIFIC NEEDS!

85 F-C

Cast and machined from Farrell's "85" and Hard Edge alloy steels and carbon steels for high resistance to shock, stress, abrasion, wear . . . as required.

*Write today for detailed information about Farrell-Cheek Special Rollers and all types of wheels.*

**FARRELL-CHEEK STEEL CO.**

HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS

F-C HARD EDGE STEEL CASTINGS

F85 STEEL CASTINGS

RAILROAD CASTINGS — Locomotive and Car R. R. Specialty Castings

ELEVATOR, CONVEYOR PARTS — Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers, Bushings.

GEARS AND PINIONS — "True Tooth" Gears and Pinions, Sheaves and Wheels.

CRANE WHEELS — Overhead, Gantry, Monorail, Ingot Car, Charging Machine.

STOKER PARTS — Feed Screws, Furnace Tools, Flanged Pipe, etc.

HEAVY HARDWARE — Complete Line Wire Rope Fittings and Cutters, Bar Benders and Cutters.

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO

# KOEHRING WORK CAPACITY *in action . . .*

**Here are some figures that will interest you:**

| KOEHRING MODEL | SIZE DIPPER | LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.) | |
|---|---|---|---|
| 205 CRAWLER | ½-Yd. | 20,000 lbs. | at 10-ft. radius |
| 205 ON RUBBER | ½-Yd. | 30,000 lbs.<br>14,600 lbs. | at 12-ft. radius<br>at 20-ft. radius |
| 305 CRAWLER | ¾-Yd. | 30,000 lbs. | at 12-ft. radius |
| 305 ON RUBBER | ¾-Yd. | 30,000 lbs.<br>15,800 lbs. | at 10-ft. radius<br>at 30-ft. radius |
| 405 CRAWLER | 1-Yd. | 40,000 lbs. | at 12-ft. radius |
| 445 ON RUBBER | (Crane only) | 90,000 lbs.<br>40,000 lbs. | at 15 ft. radius<br>at 25-ft. radius |
| 605 CRAWLER | 1½-Yds. | 72,300 lbs. | at 12-ft. radius |
| 805 CRAWLER | 2-Yds. | 104,200 lbs. | at 12-ft. radius |
| 1205 CRAWLER | 3-Yds. | 190,000 lbs. | at 12-ft. radius |

*Want more information?* *See Koehring distributor.*

**Solid footing on soft banks —** Loading gravel off the bottom of a water-filled pit, Koehring 405 dragline (above) holds firmly to the edge of soft, loose banks. Stability of its extra-long, extra-wide crawlers shows up to good advantage in conditions like this. Extra stability means extra work-capacity, too. The heavy-duty 405 handles 1 to 1½ cubic-yard dragline or clamshell buckets on a wide work-radius — boom lengths range from 40 to 90 feet. Butt-connected boom is solid, safe. Inserts are easily changed. Check the 405's other work capacities (in chart) — then have Koehring distributor demonstrate what it will do on your lifting, loading, stripping, stockpiling.

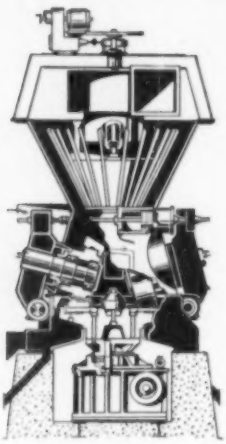
**Quarry rock —** ¾-yard 305 loads out Lannon stone in a Mid-West quarry. It's a rugged rock shovel, with exceptional operating ease. Big 23-inch main-drum power clutch requires only 1/10th the lever-pull of a comparable-size manual clutch — yet, retains "feel" of load.

**15-ton handyman —** With its heavy lift capacity and high-speed mobility, Koehring 205 truck crane is a handy material-handling rig to have around. It unloads heavy equipment and supplies, installs machinery — converts to ½ to ¾-yd. clamshell or dragline, ½-yd. shovel, hoe.

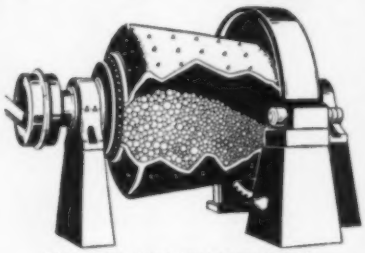
**Big stripper —** Look at the work range of this big 1205 high-lift shovel. It digs up to a height of 42 ft.-10 in. at 45° boom angle — dumps at a height of 31 ft.-5 in. That's with a 3-yard dipper on 40-foot boom. *Need more reach?* It also takes a 2½-yard dipper on a 50-foot boom — has 51 ft.-4 in. cutting height, and 40 ft.-10 in. dumping height, at 45° angle! For heaviest digging, the standard 1205 has 3-yard dipper on 30-foot boom. On dragline or clamshell work, it handles 3 to 4-yard buckets on 60 to 170 feet of boom. *Want more facts?* See Koehring distributor for complete story on this big 1205. Call today.

**KOEHRING** DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis. R701

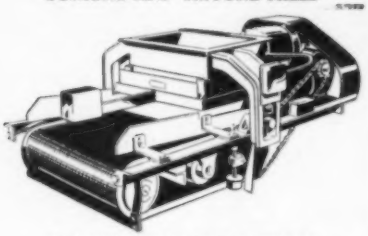
# HARDINGE MILLING EQUIPMENT



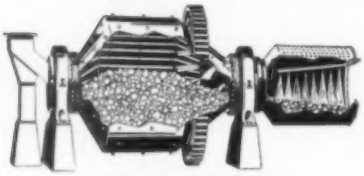
DISC-ROLL MILLS



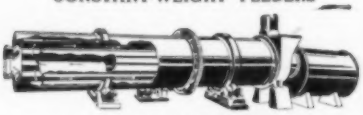
CONICAL AND TRICONE MILLS



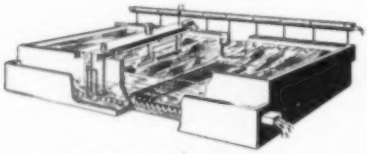
CONSTANT-WEIGHT FEEDERS



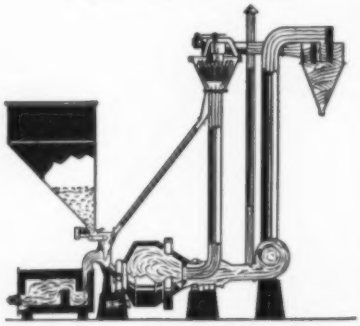
CONICAL SCRUBBERS



RUGGLES-COLES DRYERS

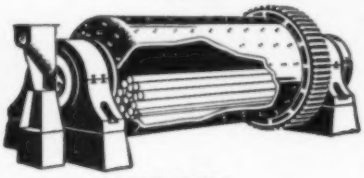


AUTOMATIC BACKWASH SAND FILTERS



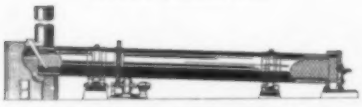
"GYROTOR" AIR CLASSIFYING SYSTEMS

"AUTO-RAISE" THICKENERS



ROD MILLS

HYDRO-CLASSIFIERS



RUGGLES-COLES KILNS

RUGGLES-COLES COOLERS

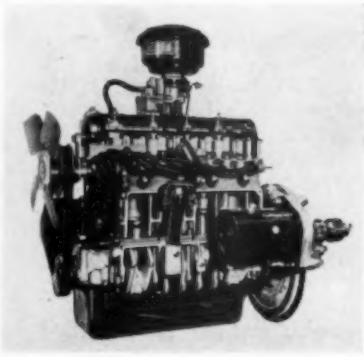
**HARDINGE**
**COMPANY, INCORPORATED**

**YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works**

**New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco**

• K-P Manufacturing Company has available an all-purpose grease gun with an adjustable nut which instantly controls the range of performance from high volume as desired to high pressure for tight fittings.

Called the V.C. (Volumetric Cartridge), the gun features a swivel spout, designed to make out-of-the-way fittings easy to reach; a floating sleeve with a lip for smoothing out dented cartridges; a special leak-proof plunger; a high-tension spring; and a safety lock plunger rod. **(66)**

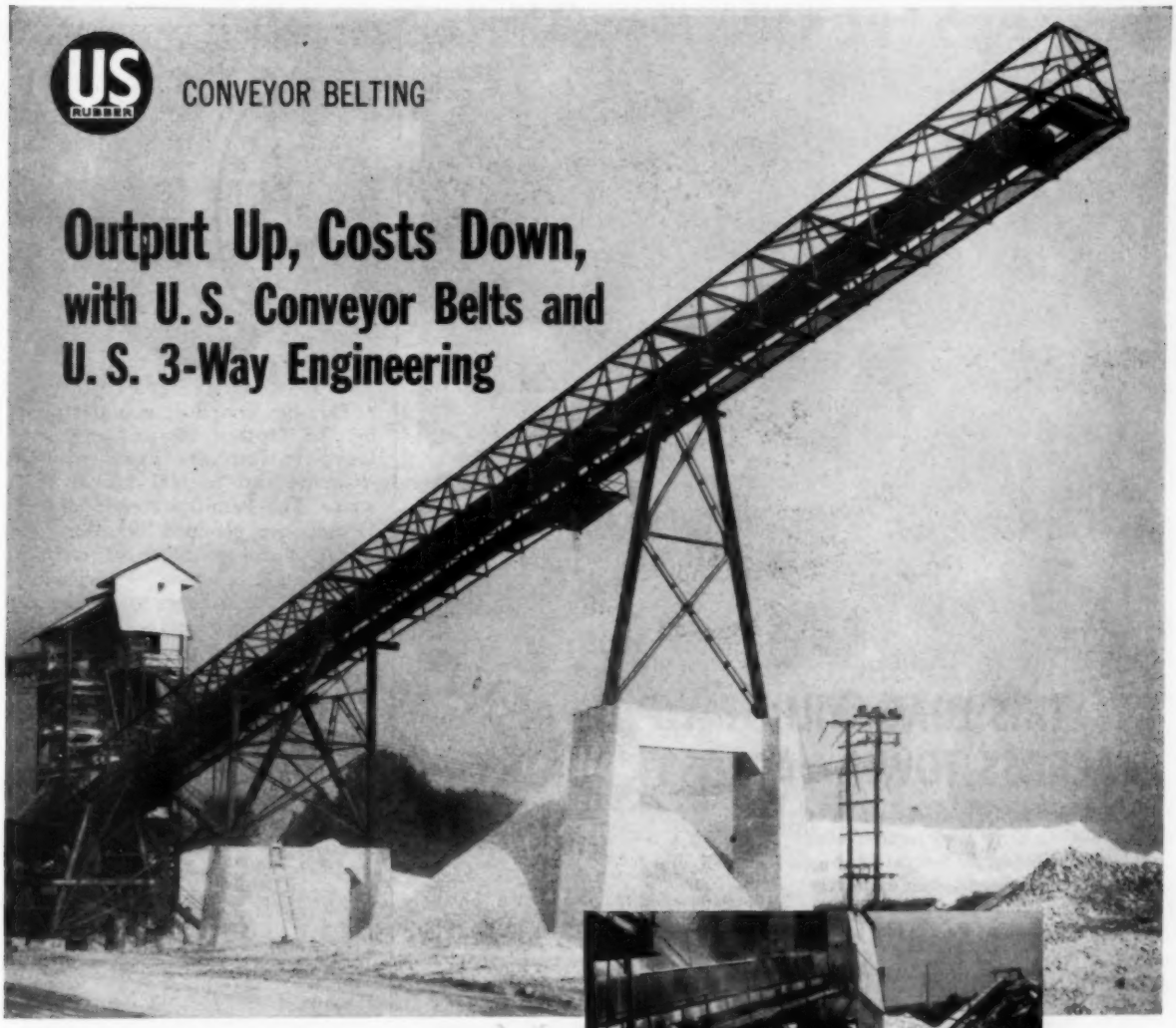


• Fageol Products Division, Twin Coach Company, has introduced the Fageol 44, a compact, lightweight engine which produces up to 45 hp. at 5,500 r.p.m.

The Fageol 44 is a 4-cycle, 4-cylinder, water-cooled power plant, featuring 9:1 compression ratio and overhead valves operated by a gear-driven overhead camshaft. Features include full pressure lubrication, built-in oil cooler, removable water jacket side plates on both sides of the block, precision insert bearings, and gear-driven gear-type oil pump. **(67)**

CONVEYOR BELTING

# Output Up, Costs Down, with U. S. Conveyor Belts and U. S. 3-Way Engineering



In order to keep up with increased demand, last year a large limestone quarry in the East* installed five U. S. Conveyor Belts, after 29 years of using trucks exclusively.

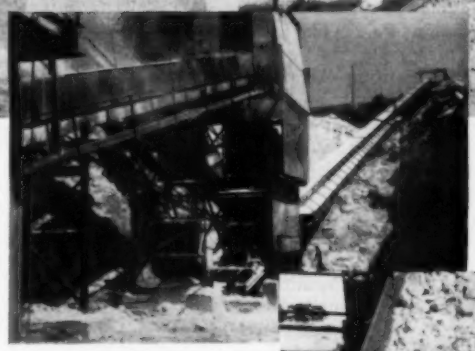
"It takes less manpower to get the rock out of the hole by the belt system," says the plant engineer, Dick Campbell, "and cost per ton is less than with trucking.

"We investigated 8 other brands before choosing 'U. S.' Belts," he continues. "The main reason for our choice was the 'U. S.' reputation for knowing how to design and build the right belt for the job."

He's referring to U. S. Rubber's famous Three-Way Engineering in which "U. S." engineers work with the engineers of the quarry and the designers of the conveyor system. "We wanted the best and we got it," adds Campbell. "Performance-wise and dollar-wise we are getting the most for our money."

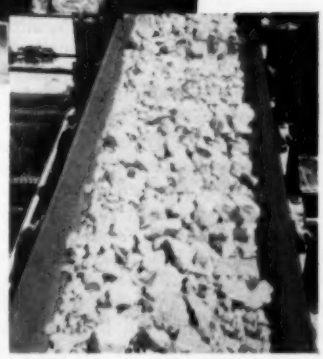
In any question involving materials handling, get in touch with any of the 28 U. S. District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Co., Ltd.



View of #1 belt entering scalping screen and #3 belt climbing to screening plant. #1 is a 233 foot, 42" 6-ply U. S. Matchless® Style XN. #3 is a 1670 foot, 42", 6-ply U. S. Matchless Style CL.

• • •



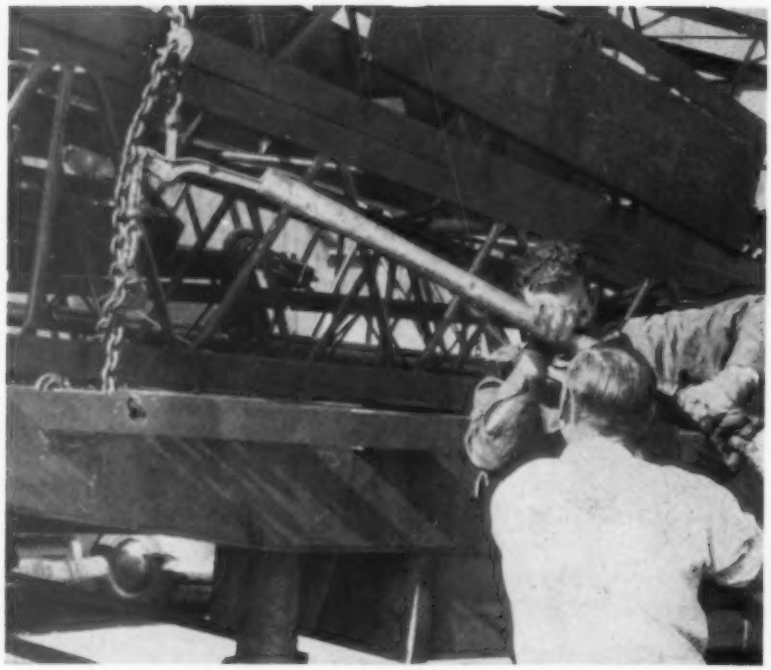
Close-up of main stone belt with a capacity of 1200 tons per hour of 7" limestone. Note the excellent troughability of this U. S. Matchless Ustex-Nylon Belt.

*Harry T. Campbell Sons' Corp., Towson, Maryland.

Mechanical Goods Division

**United States Rubber**

See things you never saw before. Visit U. S. Rubber's New Exhibit Hall, Rockefeller Center, N. Y.



# THIS LOAD WILL STAY PUT . . . ACROSS TOWN — ACROSS COUNTRY

There's no doubt about the safety of this load—or any load secured with Lebus Loadbinders. Completely drop forged, then heat treated for even more strength and durability, the millions of Lebus Loadbinders already in use have proved their ability to tie down loads of every description—keep them absolutely secured without failure *until they're released!*

You get an idea of this loadbinder's strength from the photo above. Two big truckers throw their combined weight on a long cheater without fear of breaking or bending any part—they know that, from handle to hooks, the Lebus is the strongest Loadbinder manufactured. You're assured of safe, dependable performance because each Loadbinder is thoroughly proof tested before shipment.

Equally important is the Lebus Loadbinder's convenience and safety of operation. Once the binder is locked in position, it can't snap open. Even shifting loads won't spread the handle! Exclusive Lebus designed ball and socket swivel is drop forged—won't pull apart regardless of the load! Get complete details on the number one loadbinder in every industry from Crosby Laughlin Lebus Distributors!

## WORKERS PROTECTED

Workers and materials are protected with Crosby-Laughlin Safety Hooks that keep the load in place *until it's released!* A rust-proof, non-jamming latch and spring provides a simple but safe method of keeping rings and slings

on the hook, even when the load is set down! Tough Crosby-Laughlin Hooks are drop forged then carefully heat treated. The result is superior strength and quality from a design that eliminates excess weight. Crosby-Laughlin safety and standard hooks are available in eye, hoist, shank and swivel types to give you the exact design you need. Capacities range up to 20 tons! See your nearby distributor for catalogs and technical information on a complete line of fittings!

Stocked and sold by leading distributors everywhere

**CROSBY-LAUGHLIN** *Division*

FT. WAYNE 1, INDIANA

• Para-flex couplings manufactured by the Dodge Manufacturing Corporation, are available in capacities up to 600 hp. at 900 r.p.m. The Para-flex consists of the flexible tire clamped between two hubs which are mounted on the shafts to be coupled. The flexible member is held between the flanges and clamp rings of the hubs.

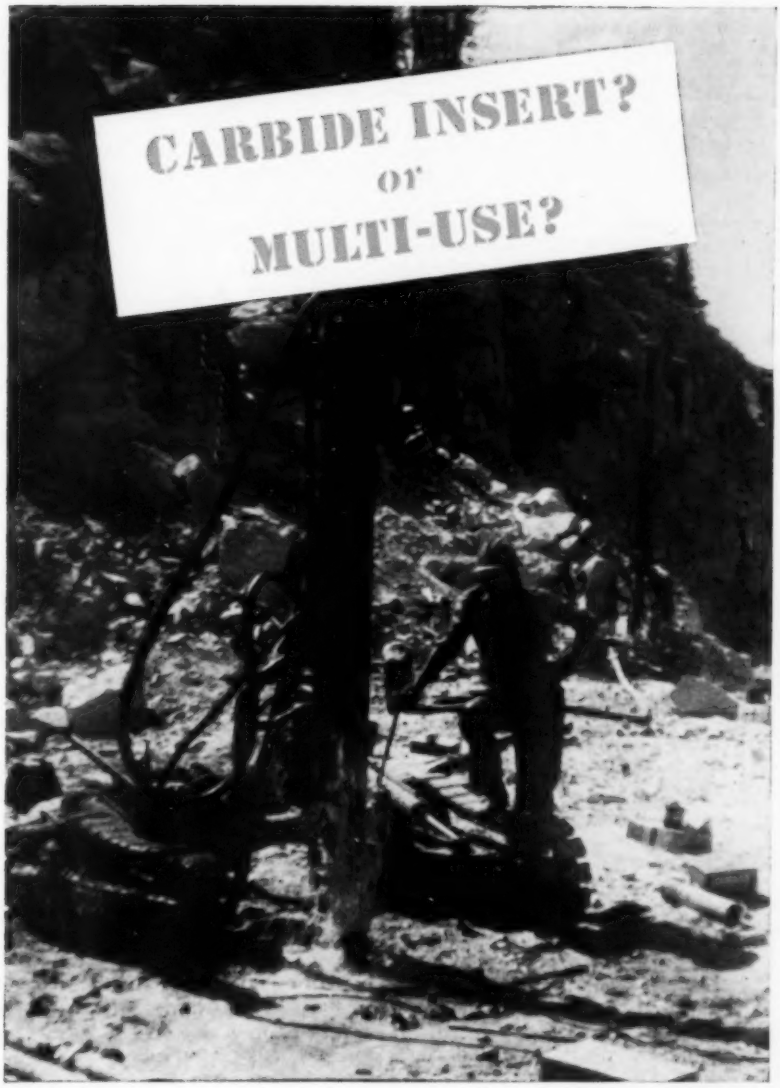
According to the manufacturer, Para-Flex couplings will take angular misalignment up to 4 degrees, parallel misalignment up to ⅛ in., and end-float up to 5/16 in., contingent upon the size of the coupling and the duration of the conditions, or it will take all of these simultaneously. The flexible member also cushions shock loads and diminishes torsional vibration. **(68)**

• A new type of oven which can be loaded and unloaded from the top, either manually or by means of an overhead hoist, has been introduced by the Grieve-Henry Company, Inc. Ovens may be electrically heated or gas-fired, and are available with either horizontal or vertical recirculating air flow pattern.

The oven illustrated has adjustable horizontal air circulation through the work space. It is electrically heated, and measures 67 in. by 38 in. from front to rear and 44 in. in height. **(69)**

# "We cut drilling costs with TIMKEN® carbide insert bits"

*. . . Reports Fisher Contracting Company*




**LOCATION—**
Park County, Colorado

**OPERATING CONDITIONS—**
Granite and porphyry

DRILLING through extremely hard and abrasive granite and porphyry, Fisher Contracting Company found that they got the lowest cost per foot-of-hole with Timken® carbide insert bits. Excellent footage and maximum regrinds per bit helped achieve overall economy.

But carbide bits may not always be most advantageous. For extremely deep holes, small diameter blast holes, and constant-gauge holes, carbide insert bits give big economies.

In ordinary ground, however, when full increments of steel can be drilled, and with correct and controlled bit reconditioning, Timken multi-use bits give you the lowest cost per foot-of-hole.

When you use Timken multi-use and carbide insert bits, your drillers save time. Dozens of different bits fit the same drill steel. You can change bits as drilling conditions change; but you use the same drill steel. And the special shoulder union of Timken bits increases bit life because it protects threads from drilling impacts.

Timken rock bits are made from the Timken Company's own electric furnace fine alloy steel. No other rock bit manufacturer goes this extra step to assure you of the highest quality. Why not let us help you select the best bit type for your drilling jobs? Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

**See the first Timken Televent hour, in color, "Eleven against the ice—story of the Antarctica Turnpike". NBC-TV, Monday night, September 23rd.**

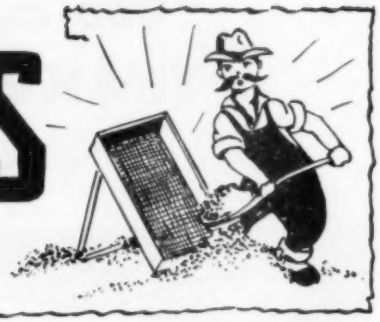
**TIMKEN**
TRADE-MARK REG. U. S. PAT. OFF.

***your best bet for the best bit for every job***

**Timken threaded multi-use rock bit**

**Timken threaded carbide insert rock bit**

# SCREENINGS



## By RAY L. SMITH JR.

ONE of our most beloved men in history knew that the psychology of dealing with people was far more important than any rules that might be set forth. He was not ashamed of sentiment. He once said something very true. Perhaps you'd like to remember it.

"When the conduct of men is designed to be influenced, persuasion — kind unassuming persuasion — should ever be adopted. It is an old and true maxim that a drop of honey catches more flies than a gallon of gall—so with men. If you would win a man to your cause, first convince him that you are his sincere friend. Therein is the drop of honey which will find little trouble in convincing his judgment of the justice of your cause, if indeed that cause is really a just one.

"On the contrary, assume to dictate to his judgment, or to command his action, and he will retreat within himself, close all avenues of his head and heart, and though your cause be naked truth itself, and though you throw it with more than Herculean force and precision, you will be no more able to pierce him than to penetrate the hard shell of a turtle with a rye straw.

"Such is man, and so he must be understood by those who would lead him even to his best interests."

That psychologist, humanitarian, who wrote always with the human touch, was our greatest President—Abraham Lincoln. He understood and loved his fellowmen.

### What Would He Do Without It?

ONE OF THE suburban Chicago newspapers reported the other day that Mrs. Joan Stocks won a temporary divorce decree, and a half-ton pickup truck. Her husband, James, was given custody of a concrete mixer.

That's at least one way to keep ex-hubby thoroughly mixed up until the divorce becomes final. Betcha it will be nice to cuddleup with on a cold moonlit night.

He also got a can opener from the kitchen wall and half the pots and pans. That's fine, now, all he needs is about 90 barrels of crude oil and a truck load of watermelons, tomatoes, etc., mix well, and he has —a mess.

At least he won't be too tied down. One nice thing about those old portable mixers; any time you get tired of one location you can just throw 'em in gear and take off like a bat out of hell.

### Potpourri and Succotash

The mother of a little Connecticut lad was anxious for a report of his first day at Sunday School recently.

"Well it was kinda nice," admitted the little fellow. "At the end everybody sang."

"What did they sing?" asked Mother.

"I don't know," he replied, "but I sang Davy Crockett."

"How dare you come home at six o'clock in the morning?" screamed the woman to her errant mate. "What possible excuse do you have?"

"I'm hungry," he said.

A bank in a midwestern town recently sent a floral horseshoe to the management of a rival bank, congratulating them on the opening of a new branch. Due to a mix-up at the florist's, the card accompanying the flowers read: "Deepest Sympathy."

Later, the bungling florist called frantically to apologize. He explained that the message was, of course, meant for a funeral. However, his real embarrassment was due to the fact that the card that was intended for the bank went to the funeral—carrying the message: "Congratulations on your new location."

Teacher: Since pro means the opposite of con, can you give me an illustration of each?"

Student: "Progress and Congress."

A young bride-to-be had been taking driving lessons in order to relieve her husband at the wheel on their honeymoon trip. In all the excitement of wedding preparations, however, she found time to get only a learner's permit.

Came the wedding and then the reception at the bride's home and the happy young couple departed in a shower of rice for their long trip. A few minutes later, the guests were startled to see the bride rush back into the house.

"Lucky we hadn't gone very far," she giggled breathlessly. "I forgot my learner's permit."

Rep. Brooks Hays of Arkansas tells about a man who came up to a congressman at a rally and said, "Did you know that Tom Sullivan is going to run against you?"

"That no-good ingrate?" snapped the congressman. "He's a real bad one—ought to be behind bars!"

"Jim Jones," continued his friend, "has also threatened to run."

"Same type, absolutely," said the congressman angrily. "A thoroughly low, evil character."

"Aw," laughed his friend, "I'm only kidding. I ran into them both and they sent you their best regards."

"Now darn it," answered the politico. "Look what you made me say about two of the sweetest, finest men in my whole district!"

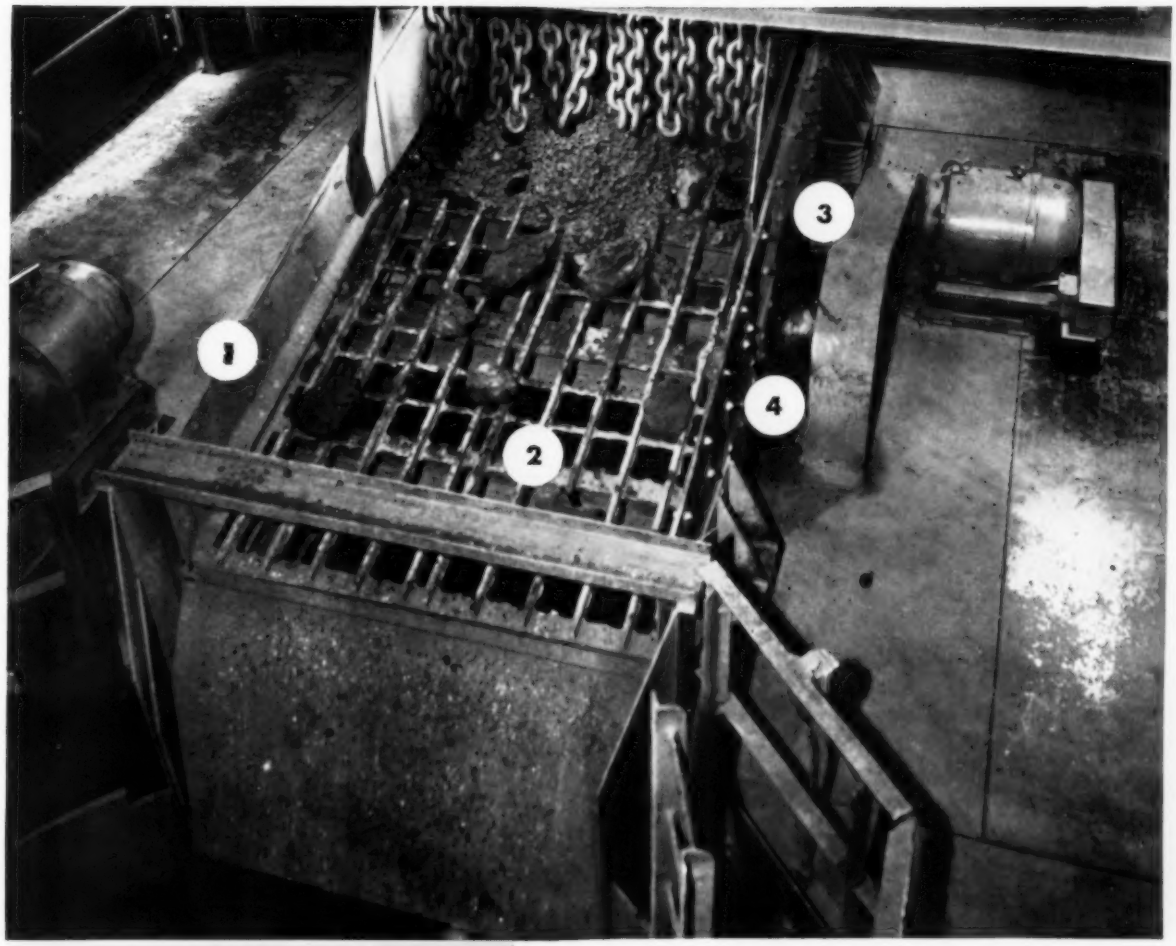
When Jim Weber Sr., popular owner of the Virgin Islands hotel, St. Croix-by-the-Sea, went to his 10th reunion at Yale some years ago, he suddenly came face to face with his old English professor, a brilliant gentleman of traditional absent-mindedness.

Jim started to put his hand out in greeting, but the professor pulled him up short.

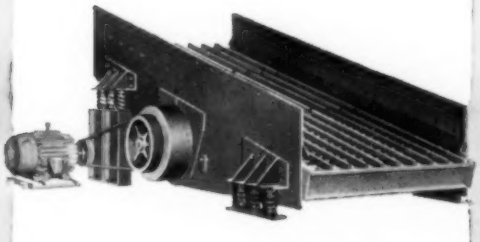
"Well, Weber," he remarked sternly, "what's the trouble? Seems to me you've been cutting a lot of your classes lately."

## Before you buy a heavy-duty scalper . . . this 4-point check can help you

# predict its performance




**And it shows why LINK-BELT "BA" scalping screens take more punishment, need less servicing**



Strength, capacity, efficiency, trouble-free operation—Link-Belt "BA" scalpers offer all these essentials for low-cost, run-of-pit service. Here's why:

1. *RUGGED, STRESS-RELIEVED FRAME* easily withstands impact from 40-in. boulders dropped from feeder.

2. *EFFICIENT VIBRATOR MECHANISM* permits screening of sticky ores at extremely high capacities.

3. *CONCENTRATED VIBRATION* in live deck provides thorough action of deepest bed. Motion is isolated from foundation by large, square-end helical springs.

4. *TWO-BEARING VIBRATOR MECHANISM* uses self-aligning, effectively sealed roller bearings for longer life. Hydraulic bearing removal device simplifies maintenance.

For complete information on this durable, powerful screen, see your Link-Belt office. Or write for Folder 2461.

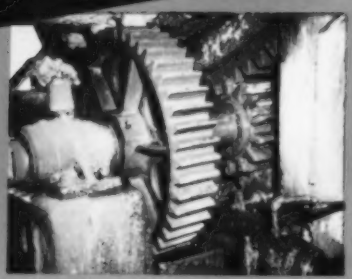
**LINK-BELT**

**VIBRATING SCREENS**

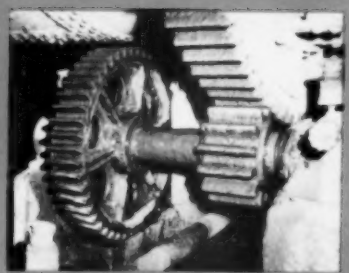
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.569

# it's TSP* in many

TSP main holding and closing drums on overhead crane. Note smooth and true grooves on TSP drums.

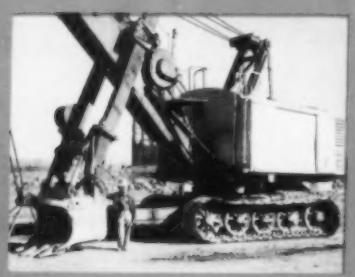


Rotary cooler showing TSP drive pinions and intermediate drive bull gear after several years service.



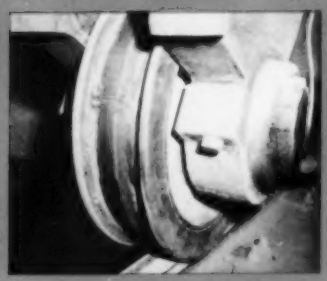
TSP main agitator drive pinion and intermediate drive bull gear after several years service.

TSP sprockets ready for installation on heavy double drag elevators.

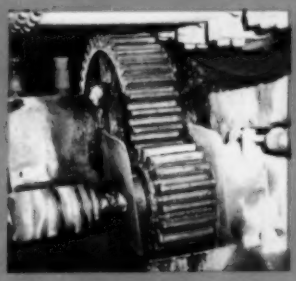


Large shovel using TSP drive gears and pinions.

Clinker burning kilns driven by TSP pinions.



Close-up of TSP wheels on bucket crane after several years service.



TSP intermediate drive pinion and bull gear after several years service on clinker burning kiln.

Raw storage crane trolley using TSP gears, pinions, wheels, drums and brake wheels. Similar TSP parts are used on another overhead storage crane.

"Tool Steel Process" products play an important part in operations at Universal Atlas Cement Company's Hudson, N. Y., plant. The installation photographs shown here give evidence that TSP products are satisfactorily meeting their positive guarantee of giving longer, more efficient life. All TSP products are hardened by our special process. The file hard surface to full depth of permissible wear gives maximum life. The core, refined for toughness and ductility, gives maximum strength to TSP products.

TSP products can save you thousands of dollars every year in maintenance and downtime. Write today for Bulletin No. 452.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI 16, OHIO, U.S.A.

AD No. 1014

The World's Standard of Quality Since 1909 for Gears • Pinions • Rolls • Wheels and Other Hardened Products

# NOW! 12-SPEED MOBILITY IN FORD'S MOST POWERFUL TRACTOR

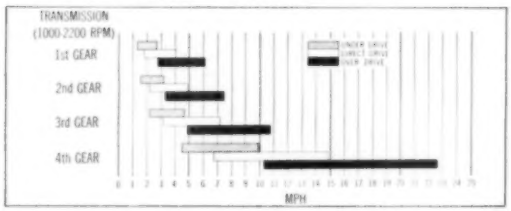
*Accessories—bumper and wheel weights.*

# NEW FORD 840 POWERMASTER

Now, for the first time, you can have the unmatched mobility of 12 speeds (factory option) in Ford's heaviest, most powerful utility tractor.

The new Ford 840 Tractor, with all of the Blue Ribbon features of the big Powermaster series, is available with either 4 speeds for general use or an over-under transmission where needed. Twelve forward speeds . . . 3 reverse speeds . . . 3 PTO speeds . . . the answer to any speed need, from creeper operations such as finish grading and transplanting, up to 20 mph and more for fast transport!

## GEARED FOR ACTION




**Easy Back-and-Forth Shifting.** The new Ford 840 Powermaster has a simple, horizontal shift pattern. Forward-reverse shifting is fast and effortless for hook-up, loading, backfilling, dozing . . . smooth, positive action for greater production on any shuttle-type job. Get all the low-cost details from your dealer today, or write to: Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

**YOU SEE MORE FORDS BECAUSE THEY SAVE MORE MONEY!**

## New Dry Cell Battery Made In Corson Co. Laboratory To Be Sold Under License

Many lime companies are engaged in other businesses, such as cement, building materials, contracting, and chemicals; but it remained for G. & W. H. Corson, Inc., to enter as almost completely unrelated field—that of manufacturing dry cell batteries.

This development is the direct result of work done in the Corson research laboratory. The new type of battery which was perfected and patented has a novel feature. It employs liquid ammonia as the solvent instead of water. Advantages claimed for the Ammonia Vapor Activated cells (designated AVA) are as follows:

1. There is less chance of internal shorts, since there is no liquid to remove from the cell edges.
2. The cell can operate over a wider temperature range— minus 65 deg. F. to plus 165 deg. F.
3. The cell can be deactivated and stored for an indefinite period.
4. It lasts longer.

Corson has made an exclusive licensing arrangement with a "joint researcher," the Eastman Kodak Company. This firm is preparing to produce various units for military and commercial applications.

---

TOMMY C. DONOVAN has been named merchandising manager for the Gypsum Division of Kaiser Gypsum Company, and RICHARD C. CROWLE has been promoted to merchandise manager of the Insulation Board Division.

Both are new positions created to accommodate increased responsibilities resulting from the company's program of expansion and diversification.

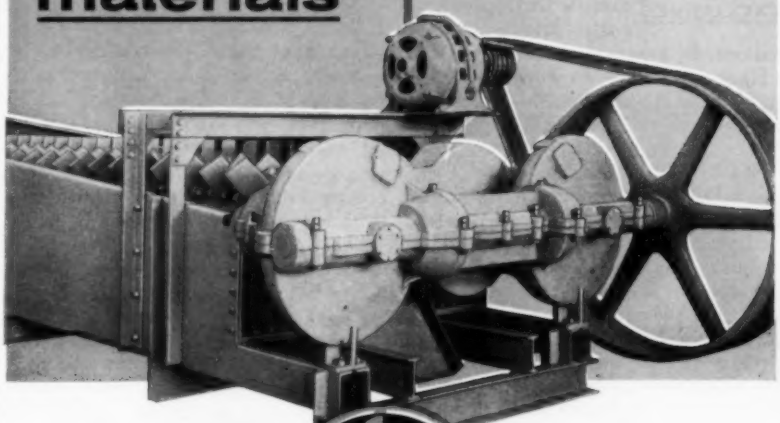
Mr. Donovan was formerly assistant general sales manager at the firm's Oakland headquarters, and Mr. Crowle was insulating products manager for the Northern California Sales Division.

RICHARD P. IMMEL has been elected executive vice-president and general manager of the American Limestone Company. Mr. Immel was previously superintendent and manager of the firm.

RICHARD E. SANSOM was named vice-president and manager of the company, and remains manager of all Tennessee divisions. American Limestone is a wholly owned subsidiary of the American Zinc, Lead and Smelting Company.


High Capacities of clean materials

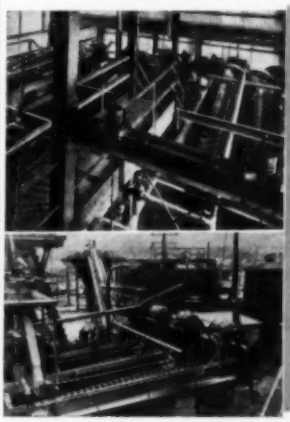
Developed from the world's first all-steel log washers built by McLanahan & Stone in 1894, these machines produce high tonnages of exceptionally clean materials—removing tough clay, soft rock and refuse with unequalled speed and economy. Available in Heavy-Duty and Mudmaster styles. *Write for Bulletins WLO-1155 and MM-755.*



McLANAHAN SINCE 1835

LOG WASHERS

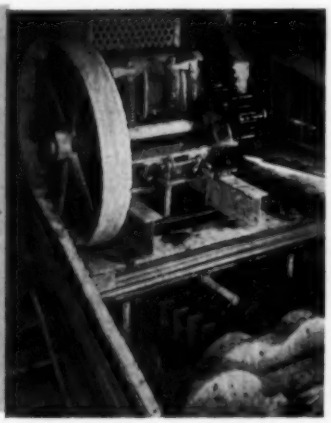
McLANAHAN & STONE CORPORATION
253 Wall Street, Hollidaysburg, Pennsylvania



Three 30' McLanahan Logs in world's largest phosphate plant.

McLanahan Logs washing iron ore received from McLanahan Rockmaster Crusher.

Three 35' Logs cleaning 400 to 500 tons of sand and gravel per hour.



# Labor Developments

ALMOST EVERY day the front pages of the newspaper carry a new story on corruption in trade unions. Certain words, previously known and used only by practitioners or students of labor relations—"sweetheart contract" and "paper local"—are becoming commonplace additions to our general vocabulary.

The mess that has been revealed cries out for a clean-up. It is unlikely that this can be done short of legislation. Nor would attempts at legislating against corrupt union practices be likely to run into the same type of unremitting opposition that met the Taft-Hartley law. Much has changed in the last ten years, including a very substantial turnover in union leadership. In addition, much has been revealed publicly which was known formerly to only a very few, who regarded silence as the better part of wisdom.

George Meany, who suceeded the aged William Green to the presidency of the American Federation of Labor and then went on to become president of the combined AFL-CIO looks like a tower of strength by comparison with his predecessor, who conducted himself as the chairman of a loose confederation of autonomous groups over which he had no power other than moral influence. Meany has forthrightly acknowledged that the labor movement itself will not be able to effectuate the necessary clean-up without government help. But it is important that, within his powers, he appears to be willing to do what he can to see the problem through. Almost single-handedly and without any really potent weapon, he prevented the combination of the corrupt International Longshoremen's Association with the worst elements of the Teamsters. While both groups still operate, their separate power for evil is only a small proportion of what their combined power would have been.

While the revelations coming out of the congressional hearings make fascinating reading, they are of only

**By S. HERBERT UNTERBERGER**

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations

Washington, D. C.-Philadelphia, Pa.

limited help in drafting the right kind of legislation to handle the situation. To date, what promises to be the most fruitful source for legislative proposals appears to have been virtually overlooked. It is the set of recommendations of the AFL-CIO Ethical Practices Committee.

This committee, appointed by Mean, appears to be representative of the most responsible elements in the labor movement, men who frequently have been victims of the irresponsibles. Their recommendations to the Executive Council look like "just what the doctor ordered" as a base for legislation, prepared by persons who are in a very good position to know what to attack and where it may do the most good.

Recommendations have been issued for codes on the following: local union charters; health and welfare funds; racketeers, crooks, communists and fascists; investment and business interests of union officials; financial practices and proprietary activities of unions; and union democratic processes.

These, too, make interesting reading. Space limitations permit the reproductions of only a few of the 50 sections of the proposed code, but it is clear that a Johnny Dio could probably not have thrived if the following provisions of the code could have been enforced:

"A charter should never be issued or permitted to continue in effect for a 'paper local' not existing or functioning as a genuine local union of employees."

"A charter should never be issued to persons who are known to traffic in local union charters for illicit or improper purposes."

Nor would a Dave Beck have thrived if the following provisions of the code could have been enforced.

"No responsible trade union official should have a personal financial interest which conflicts with the full performance of his fiduciary duties as a workers' representative."

"Neither the AFL-CIO nor any national or international union affiliated with the AFL-CIO should make personal loans to its officers, representatives, employees, or members, or members of their families, for the purpose of financing the private business or investment of such persons."

Nor would the scandals involved in the operation of health and welfare plans have developed if the following provision of the code could have been enforced:

"No union official, employee, or other person acting as agent or representative of a union, who exercises responsibility or influence in the administration of welfare programs or the placement of insurance contracts, should have any compromising personal ties, direct or indirect, with outside agencies such as insurance carriers, brokers or consultants doing business with the welfare plan."

Of all the provisions of the code, those which deal with democratic processes are probably the most important. Clearly, the greatest corruption appears to be found in unions which are the least democratic. It is likely that many of the problem would be solved if, in fact, each member of a union had the right to "full and free participation in union self-government, including the right to vote periodically for his local and national officers," "to honest elections," "to stand for and to hold office, subject only to fair qualifications uniformly imposed" and "to voice his views as to the method in which the union's affair's should be conducted," as the code requires.

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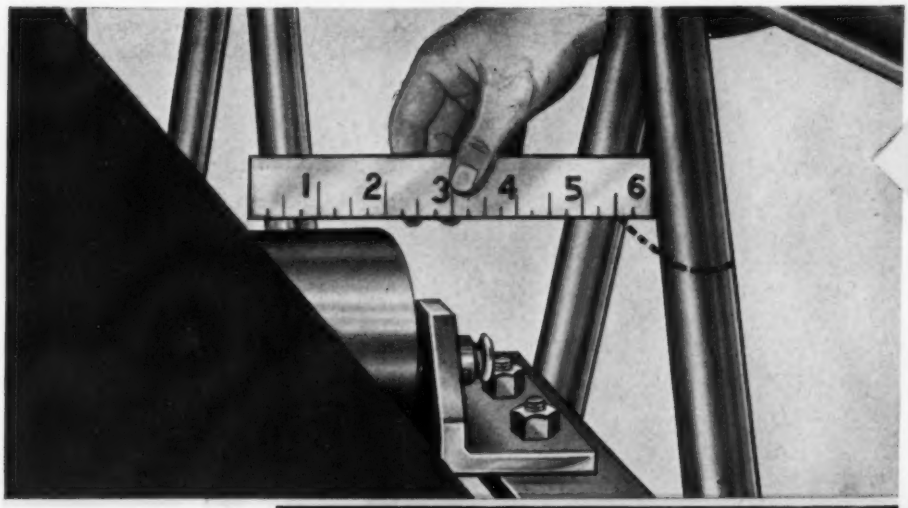
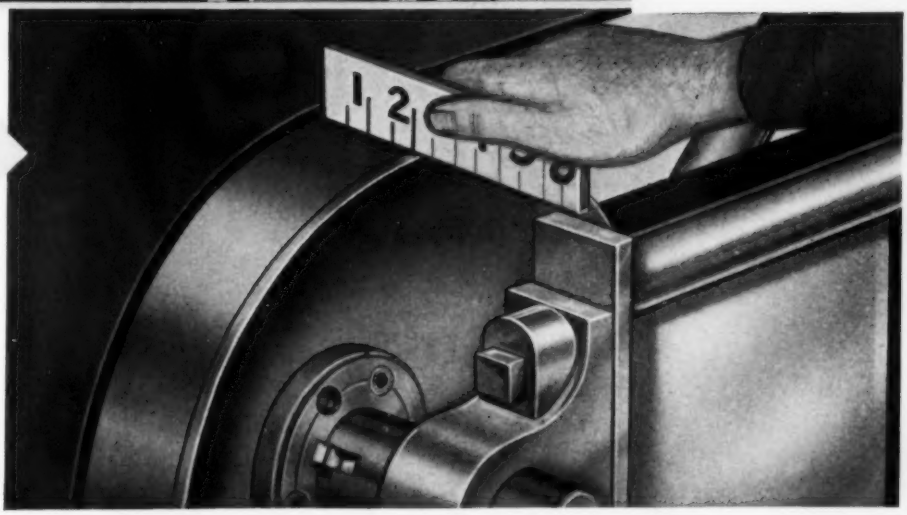
According to the annual report published by the Peerless Cement Corporation, net sales for the year ended April 30, 1957, amounted to $16,596,716; the comparable figure last year was $15,071,593. Net earnings for the year were reported to have been $2,372,496, compared with net earnings of $2,232,346 a year ago.




**WIDER FRAME...**
*MARCO Tubular Frames are widest in the industry. They provide 100% more space (5½") in the critical area... between belt edge and nearest frame member. Pedestal type return idler brackets are used, instead of hanger brackets that confine and damage belt.*

**WIDER FACE PULLEYS...**
*MARCO is first with modern pulley specifications. 2" between belt and pulley edge...provides 100% greater protection than outmoded standards. Reduces possibility of belt destruction caused by "belt wandering" in high tension areas.*




# WHY RISK COSTLY, CONVEYOR BELT DAMAGE?

## Only wider, MARCO Tubular Frame Conveyors provide maximum 'belt-edge' protection

Repairing or replacing conveyor belt represents the largest maintenance expense in a conveyor installation. To prolong belt life, MARCO conveyors are first to have all these belt-protecting features.

**Wider Frame:** Completely outmodes other conveyors that narrowly confine and damage belt should severe 'belt-wandering' occur.

**Wider Face Pulleys:** MARCO'S wider frame permits the use of modern, wider face pulleys to further protect belt from damage should 'belt-wandering' occur.

**All Tubular Members:** MARCO Tubular Frames are more rigid. Constructed of the strongest known structural member, these frames are modern ...and resist material and water build-up. Sharp 'belt-cutting' edges are eliminated with this exclusive construction.

**Rigid Joint Construction:** Another MARCO exclusive...4 bolts in each connection...16 in each joint. Not the usual 1 or 2 per connection. Joints are more rigid. Resists frame misalignment, simplifying belt training and increasing belt life.

If wind, uneven loading or other factors should cause 'belt-wandering'... with a MARCO frame you have the most complete protection possible against costly 'belt-edge' damage. This greater protection is yours at no greater cost.

### MARCO'S Quality and Exclusive Features Mean More for Your Conveyor Dollar...

Remember, your conveyors are not mere plant accessories... they deserve the attention of a specialized manufacturer offering modern specifications, carefully and properly designed to meet your most exacting requirements. It will pay you to check MARCO quality, exclusive features and proven performance record before you buy.

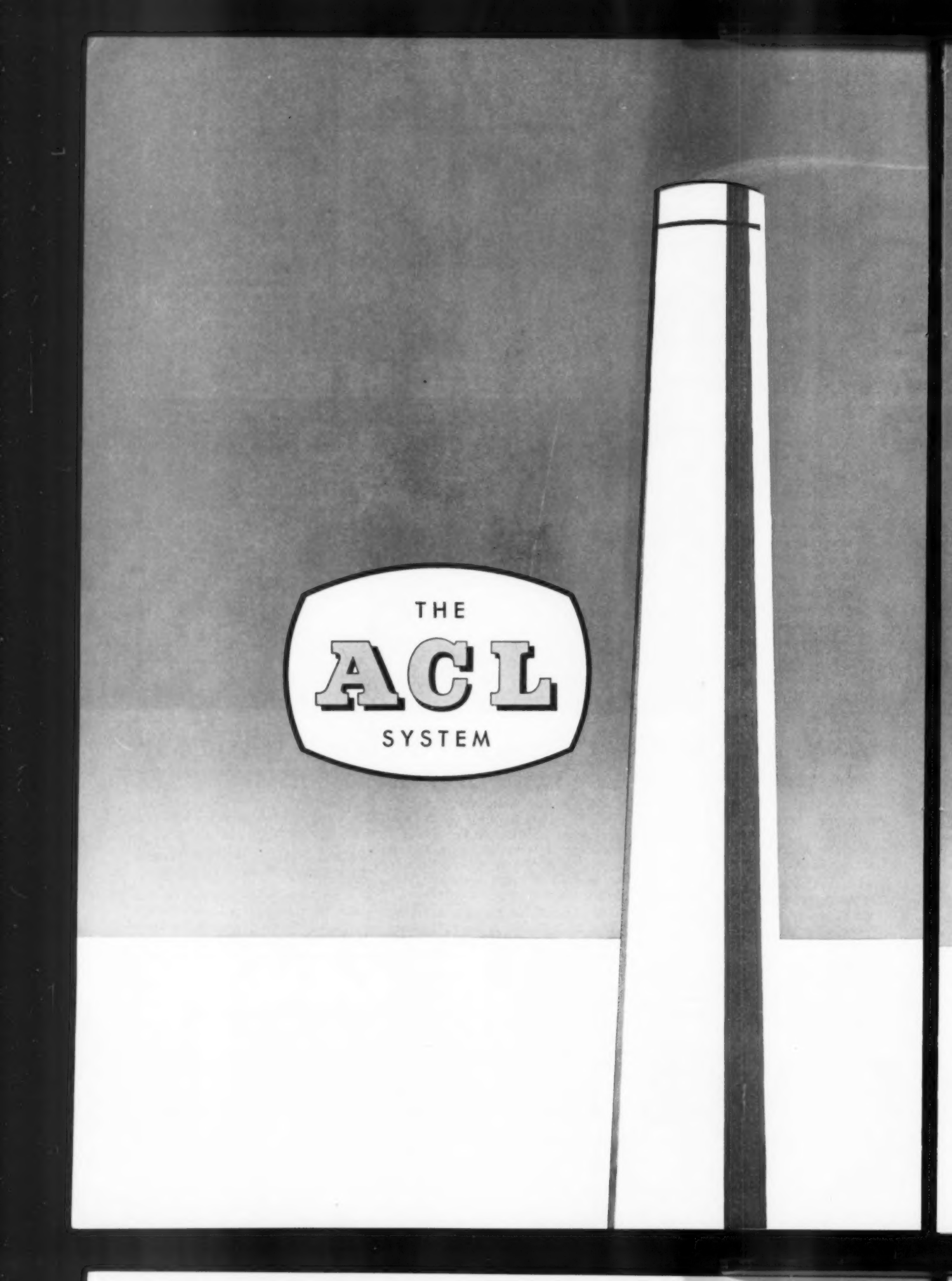
*For more information* see your Marco distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

MARCO*

*Trademark Reg.

**engineered MARCO products:**

Tubular Frame Belt Conveyors · Conveyor Idlers · Solid and Self Cleaning Steel Pulleys
Bucket Elevators · Control Gates · Feeders · Bins


THE
ACL
SYSTEM

# CLEAN

## Stack discharge is merely a wisp ...with ACL System

The introduction of the *ACL* kiln clinkering system marks a bright new era . . . an entirely new concept of *cleanliness* in cement making. This modern cement-burning method is so clean that a plant has been built in the heart of a large city. With a stack discharge aptly described as "merely a wisp," the *ACL* System has no trouble meeting the most stringent air pollution codes.

But cleanliness is just one of the many advantages of the *ACL* System. Maximum burning efficiency, reclamation of material, fuel economy, power savings, conservation of space — all these benefits are yours when you utilize the *ACL* System in coping with the challenge of more cement . . . better cement at lowest cost.

For complete information see your nearby Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8431.

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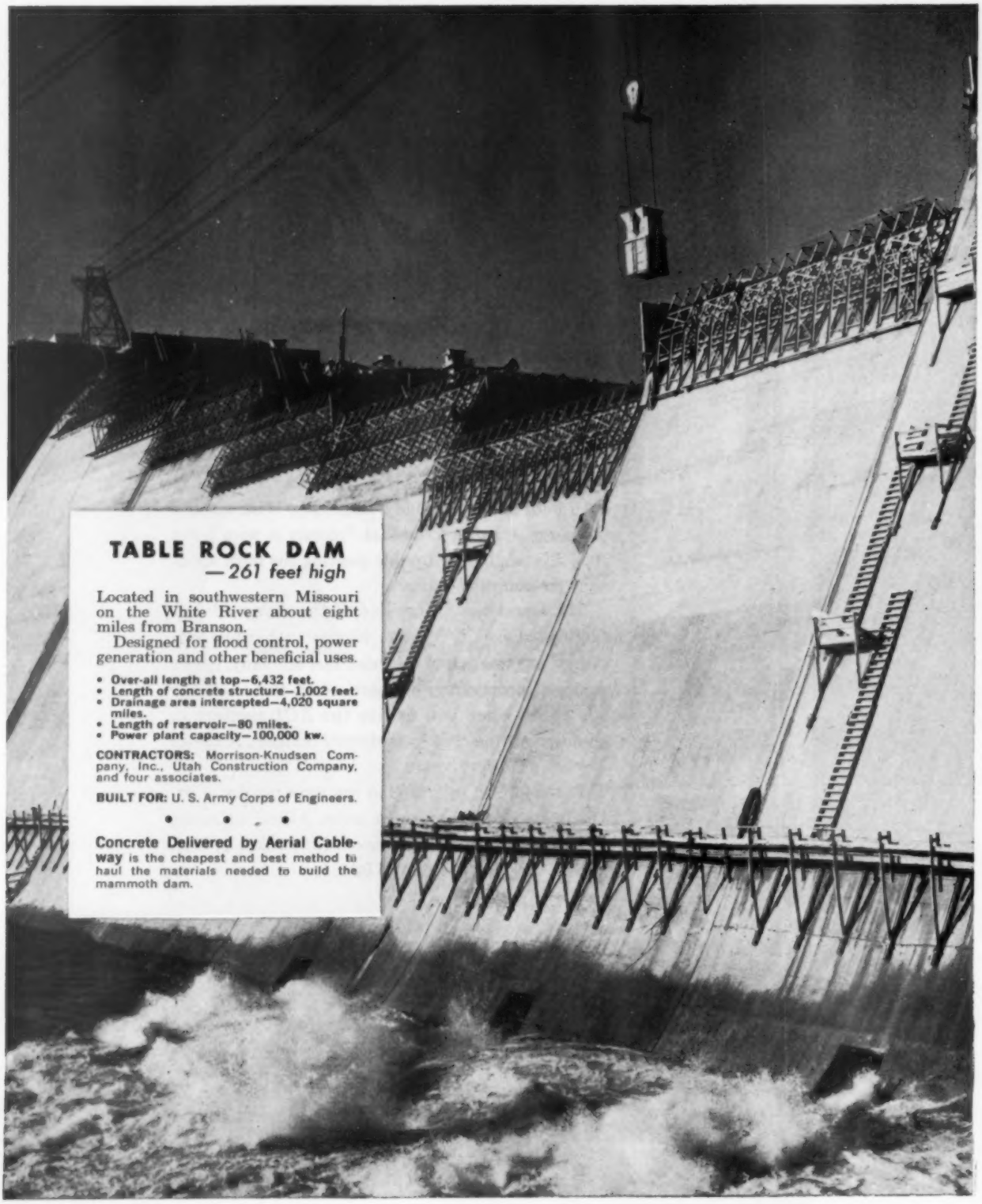
**ALLIS-CHALMERS**

# TABLE ROCK DAM



## TABLE ROCK DAM
*—261 feet high*

Located in southwestern Missouri on the White River about eight miles from Branson.

Designed for flood control, power generation and other beneficial uses.

- **Over-all length at top—6,432 feet.**
- **Length of concrete structure—1,002 feet.**
- **Drainage area intercepted—4,020 square miles.**
- **Length of reservoir—80 miles.**
- **Power plant capacity—100,000 kw.**

**CONTRACTORS:** Morrison-Knudsen Company, Inc., Utah Construction Company, and four associates.

**BUILT FOR:** U. S. Army Corps of Engineers.

• • • •

**Concrete Delivered by Aerial Cableway** is the cheapest and best method to haul the materials needed to build the mammoth dam.

# NEARS COMPLETION

## Aerial cableways

## pour 1,200,000 cubic yards of concrete

Two aerial cableways, spanning the White River, have been highballing concrete into this giant gravity-type dam since May 1955. At averages of better than 3,000 cubic yards a day, the contractors have been on schedule all the way.

The main cableway is rated at 25 tons hook load capacity and operates with an 8-yard bucket on a 2600-ft. span. The auxiliary cableway is a 15-ton unit operating with a 4-yard bucket on a 2350-ft. span.

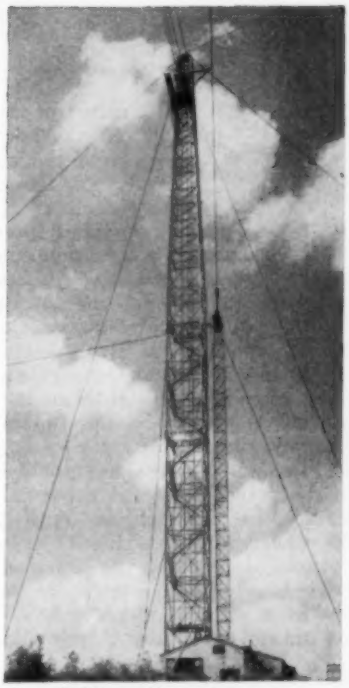
For maximum operating efficiency the contractors chose American Tiger Brand Locked Coil Track Cables for these cableways. They wanted a "Main Gut," as they call them, on each, "that would pour the job without interruption." A 3¼-inch-diameter Special Grade Locked Coil Cable with a strength of 580 tons was selected for the 8-yard cableway, and a 2¾-inch-diameter Locked Coil Cable of 420 tons was chosen for the 4-yard cableway.

American Tiger Brand Rope has done a tremendous job in all phases of this project. From the cableway operating ropes to the general purpose winch lines, they were selected for their superior wearing qualities as well as for strength and resistance to fatigue.

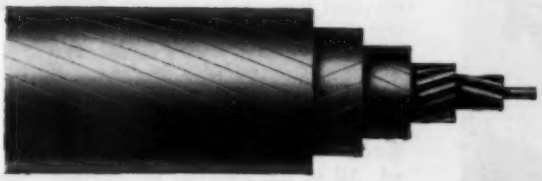
On big projects like this where long service and low-cost operation are so important, Tiger Brand Wire Rope is the favorite choice of contractors in all parts of the country.

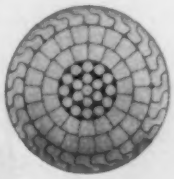
**AMERICAN STEEL & WIRE DIVISION**
**United States Steel, General Offices: Cleveland, Ohio**

Columbia-Geneva Steel Division, San Francisco
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York



**Four Cableway Towers** support the two main cables. One of them is as high as a 44-story building and carries a tension load of 436,000 pounds.





**The "Gut"** or main cable—a U.S.S. American 3¼" Locked Coil Track Cable—is 2,569 feet long. Interlocking construction holds each wire in its proper place so that it cannot unravel even if a wire should break.

**USS AMERICAN TIGER BRAND WIRE ROPE**

*Excellay Preformed*

UNITED STATES STEEL

# Inland's New Gravel Plant

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE nature of the sand and gravel deposits from which the Denver, Colo., area gets its aggregates presents production problems which have resulted in some of the most unusual and interesting plants in the industry. The newest plant in this area, that of the Inland Sand and Gravel Company, carries on this tradition. It is a modern, flexible operation capable of producting a wide range of sizes and adjustable to wide variations in the gradation of the deposit. It is designed to handle an input of 300 t.p.h. and is averaging 200 t.p.h. of finished products, the difference being largely in an excess of 8- and 16- mesh material which is wasted. At present five salable products are being made: sand; 3/8-in. chips; and 1/4- to 5/8-in., 1/4- to 3/4-in. and 3/4- to 1½-in. gravel. Also notable is the use of the first large hydraulic dredge in this area. The demand, low earlier due to heavy rains, recently made it necessary to put the plant on a 2-shift basis.

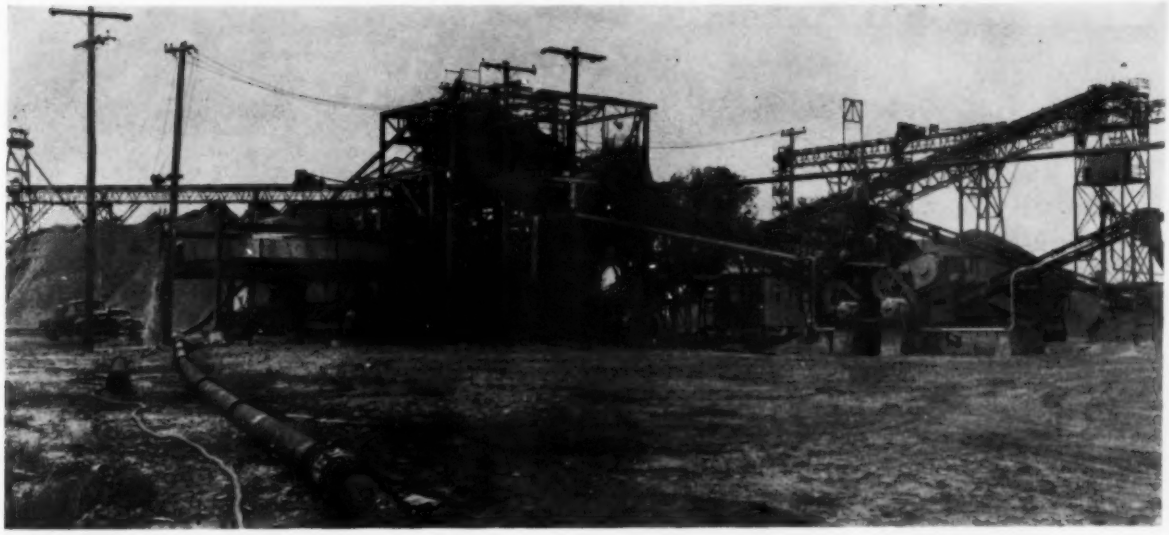
Inland Sand and Gravel is a subsidiary of the Inland Construction Company of Omaha, Nebr., one of the larger highway contractors also operating commercial sand and gravel plants at Topeka and Wichita, Kans. The local company was formed late in 1955, and the plant was in operation in May, 1956. It was built to supply commercial demand and any contracts the parent firm may get in the area.

A. B. Nuss, vice-president of the parent company, who is in charge of its western division, drew up the basic design of the plant in co-operation with the Hack Engineering Company of Denver. This firm did the detailed design and mechanical layout, built or supplied the equipment to Inland specifications, and erected the plant, with Inland help. John Alger, plant manager, has had many years of experience in the production and use of aggregates.

The plant is located at 7620 Madison Street, North in Adams City, a suburb of Denver, and about 5 miles north of the center of that city. The river bed deposit is at the junction of Clear Creek and the Platte River. This is the only plant operating on the Platte River north of Denver, most of them being further west on Clear Creek, which is notable for coarse gravel and sand. The deposit averages 30 ft. in depth and is well graded, with about 45 percent under 1/4 in. in size, and very little over 2 in. The overburden is light and consists largely of sand; so it is not removed.

Opening of the dredge pond was accomplished with a dragline, which supplied the plant while the dredge was being assembled in the pond. The ground water level is normally 3 ft. below the surface, although due to heavy rains, it is now only 1½ ft. So it is obvious why the dredge recovery method was selected. All of the material meets specifications for concrete aggregates and other uses. Some soft particles found in the top 3 ft. of the deposit are removed by hand picking and a log

Inland Sand & Gravel Company's suction dredge with compartmented steel hull and 12-in. pump. A high-pressure water jet agitates the deposit.



This view of the plant shows the dredge pipeline to the plant, the bowl classifier, the revolving scrubber screen, and the crushing department.

washer and revolving scrubber.

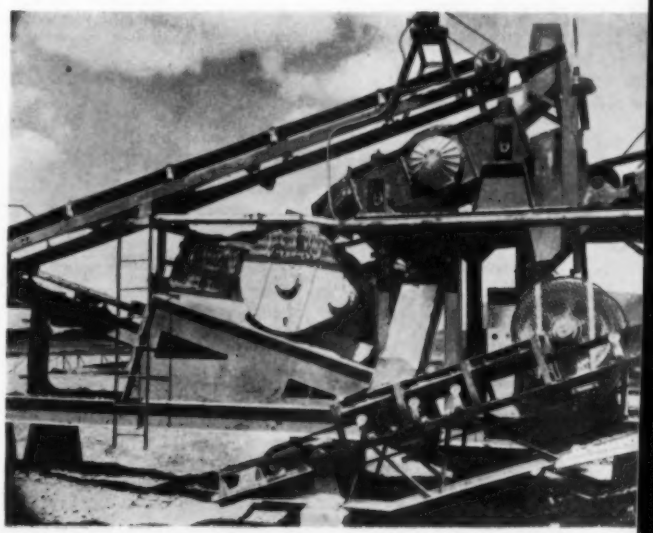
The dredge is of standard design with an all-welded, compartmented steel hull 20 ft. wide and 50 ft. long. It is anchored by means of a spud and two shore lines. A 38-ft. steel suction ladder supports the intake line and nozzle and a high-pressure jet agitates the deposit to make dredging easier. A 4-stage pump supplies the necessary pressure. The 12-in. Thomas dredge pump is driven by a 300-hp. motor. The 10-in. discharge line is supported on steel drums which also carry the 2,400-v. armored cable power line. Armco spiral-welded pipe, Goodyear suction hose and flexible hose connections, and Dixon hose clamps are used.

At the plant the dredge line discharges into a boil or breaker box from which the material is discharged into a Hack revolving scrubber screen. This is 5 ft. in dia. by 22 ft. long and has an 11-ft. long sand jacket. The main barrel consists of 4 ft. of scrubber section, followed by 8 ft. of ⅝-in., 4 ft. of 1-in., and 6 ft. of 2-in. round-opening punched plate. The sand jacket has 4 ft. of ⅜-in. and 8 ft. of ¼- and 9/32-in.

Oversize (plus 2-in.) from the end of the trommel is carried on an 18-in. by 70-ft. belt conveyor—inclined downward—to a 10- by 36-in. Cedarapids jaw crusher. Some handpicking of soft particles is done on this conveyor. A series of two 18-in. belt coveyors feed the crusher product to a 3- by 6-ft. Productive Equipment Corp. 1-deck screen. This has 1½-in. openings. The oversize from this screen goes to an 18- by 24-in. Cedarapids roll crusher with one corrugated and one smooth roll. The product of this crusher also goes *via* the two belts to the screen. The throughs from the screen (minus 1½-in.) are carried on an 18-in. belt conveyor to a 3- by 6-ft. Simplicity 2-deck sizing screen at the top of the main plant building. This has ⅝- and ½-in. openings.

The ⅝- to 1½-in. gravel off the top deck of this screen is discharged by gravity back into the trommel, effecting an intimate blending of the crushed and uncrushed gravel.

## latest of unusual operations designed for special local problems



A closeup of the crushing department; material goes first to the jaw crusher at the right, then to the screen above, and the roll crusher at the left.

The ⅜- to 1½-in. gravel goes to this 36-in. by 16-ft. single-screw washer, which has half the flights replaced by log washer paddles.

The ¼- to ⅝-in. material is chuted to a bin for truck loading. Minus ¼-in. material through the bottom deck goes to the sand screw.

The 1- to 1½-in. material through the 2-in. round perforations in the end section of the trommel, and the ⅜- to 1-in. material off the end of the sand jacket are chuted together to a 36-in. by 18-ft. Eagle Iron Works single-screw washer in which the first half of the flights are replaced by log washer paddles. The washer product is discharged direct on a 5- by 8-ft. Productive Gyroset 3 deck screen. This has ⅞-, ¼- and .063-in. openings and is equipped with high-pressure washing sprays.

The 1½-in. finished product (¾- to 1½-in.) off the top deck of this screen is carried on an 18-in. by 150-ft. belt conveyor to one of two 18-in. by 150-ft. horizontal distributing conveyors on a steel framework over a stockpile reclaiming tunnel. This discharges *via* a stationary tripper and off the end of the belt to storage piles *via* stone ladders.

The ¾-in. finished product (¼- to ¾-in.) off the second deck of this screen is carried on a parallel 18-in. by 150-ft. conveyor to the second distributing conveyor and is similarly discharged *via* two stone ladders to two piles over the reclaiming tunnel.

The .036- to ¼-in. material or squeegee, over the bottom deck of this screen is flumed into a tank, from which it is pumped by a 6-in. Wilfley sand pump to the worked-out end of the dredge pond.

The minus .036- in. sand and water through the bottom deck of this screen goes to a sand screw to be described later.

The ⅜-in. minus sand and water through the sand jacket of the trommel spreads out in a wide flume to a 5-ft. wide by 4-ft. long sloping stationary screen with .036-in. openings.

Sand going over this screen (.063- to ⅜-in.) goes to a second 5- by 8-ft. Gyroset screen with two decks. This has 9/32- and .036-in. openings and is also equipped with sprays. The ⅜-in. chips are chuted to a pile and sold for road seal. The material retained on the bottom deck is coarse squeegee and also goes to the Wilfley pump to be washed.

Sand and water through the stationary screen goes to a sluice trough with riffles which will catch the gold found in most deposits in this area. This sluice discharges into a Woods 30-ft. dia. Auto-Vortex bowl classifier which overflows the water and the minus 200-mesh sand and silt to the dredge pond by means of a concrete apron. This apron extends under the entire wet part of the plant, and occasional hosing carries away all the spillage which is such a nuisance around a plant.

Minus .036-in. to 100-mesh sand is discharged from the bottom of the classifier cone so dry that it can be carried on a 24-in. by 30-ft. horizontal belt conveyor to an Eagle Iron Works sand dewatering screw with two 30-in. by 25-ft flights. The minus .036-in. material and water from the 2-deck vibrating screen goes to an Eagle scalping tank and from this to the same screw. A second Eagle scalping tank is installed which can give additional sand classifying capacity when needed.

A composite view of the plant, showing the car and truck loading stations at the left, the gravel storage system, with reclaiming tunnels, and the sand storage system to ground stockpiles.

# HOLD EVERYTHING!

## BIG NEW SERIES E TRAXCAVATORS*

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**For the extra-rough jobs**

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Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

**CATERPILLAR***

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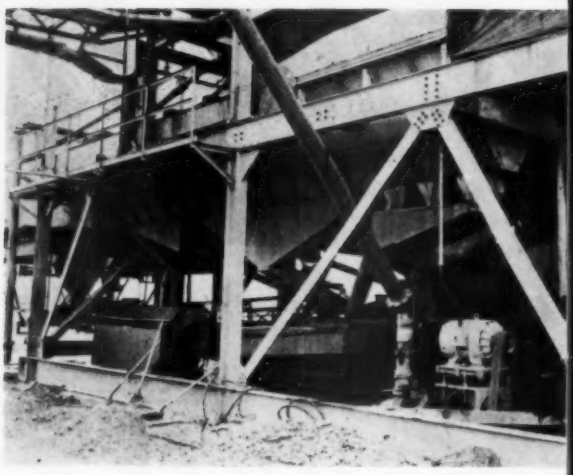
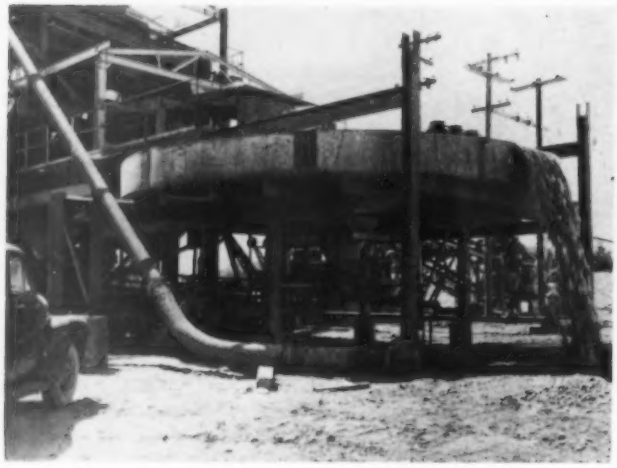
**ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.**

The two 5- by 8-ft. vibrating screens, one sizing ⅜- to 1½-in. gravel and the other .063 to ⅜-in. material.



A closeup under the plant showing the sand scalping tanks and the 4-in. pump which feeds to the classifier.



A closeup of the 30-ft. dia. bowl classifier which overflows on a concrete apron to the dredge pond.

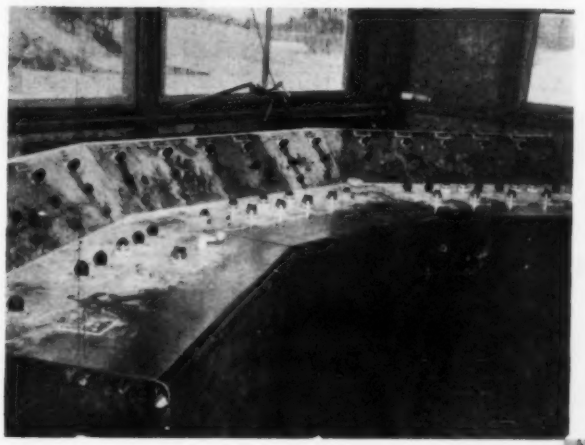
Sand is discharged from the bowl classifier dewatered enough to be carried on belt conveyors for further processing.

The water and the small amount of fines overflowing the twin screw is fed by a 4-in. Denver Equipment Co. rubber-lined pump to the Woods classifier. The sand from the screw washer is carried on a 24-in. by 100-ft. inclined belt conveyor to a separate horizontal stockpiling conveyor—24-in. by 150-ft.—on a steel framework. This has a taveling tripper, and the stockpile has a capacity of 10,000 tons, which is reclaimed by loading equipment.

The main stockpile system has a capacity of 18,000 tons on each side, both over a 300-ft. long corrugated metal reclaiming tunnel. On the 1½-in. gravel end of the tunnel are three openings, two for the gravel and one to be used later for sand; on the ¾-in. gravel end there are two openings. Belt feeders driven through gearmotors control the discharges from either side onto two 24-in. by 150-ft. reclaiming belt conveyors. These discharge at the center onto the same 24-in. by 70-ft. inclined belt conveyor to the truck-loading station.

If desired, the material can be discharged onto a 24-in by. 50-ft. conveyor to what will be the car-loading station when a railroad siding is put in. A re-rinsing screen at this point can be used for truck loading when desired. All truck shipments are weighted on a Fairbanks-Morse truck scale with a Printomatic recorder. Loading from ground stockpiles is done by a Michigan 2¼-cu. yd. pneumatic-tired tractor loader. Wash water for the plant is supplied from two 30-ft. wells. A 600-g.p.m. Fairbanks-Morse Pomona turbine pump, driven by a 25-hp. motor, supplies water for the log washer and the trommel. A 300-g.m.p. F.M. Pomona pump driven by a 7½-hp. motor supplies water for the screen sprays and the sand screw.

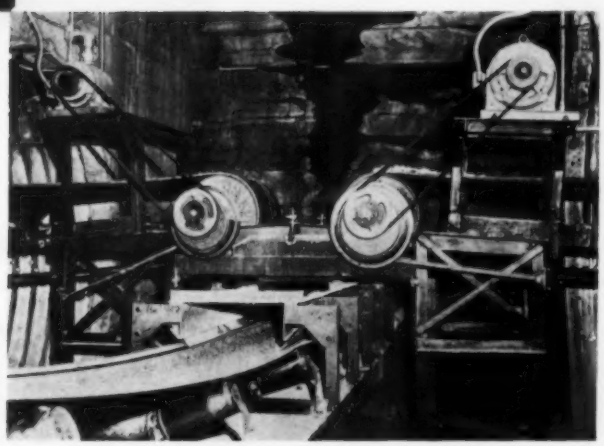
The conveyors for this plant are Barber-Greene, but the framework was supplied locally. Plant conveyors are driven through V-belts and vibrating screens are driven through American Pulley gear reducers. The V-belts and the trommel through a Foote gear reducer. Electro Dynamic motor reducers are used on the screw and log washers, and on the



Above: The control board from which all equipment in the plant, up to the storage systems, is operated.

Right: The two reclaiming tunnel conveyors under the gravel storage stockpiles discharge on the main loading conveyor.

Below: Loading of sand from stockpiles into trucks is done with this highly maneuverable 2¼-cu. yd. tractor loader.



tunnel reclaiming and loading conveyors.

From the control and electrical standpoint, this plant is well ahead of current practice in the industry, every possible precaution having been taken for efficient, troublefree operation and the safety of equipment and employees. The processing plant is operated from a central control board which has pushbuttons and signal lights for all conveyors, screens, crushers, classifiers, etc. Starting is by pushbutton, but stopping is automatic in sequence.

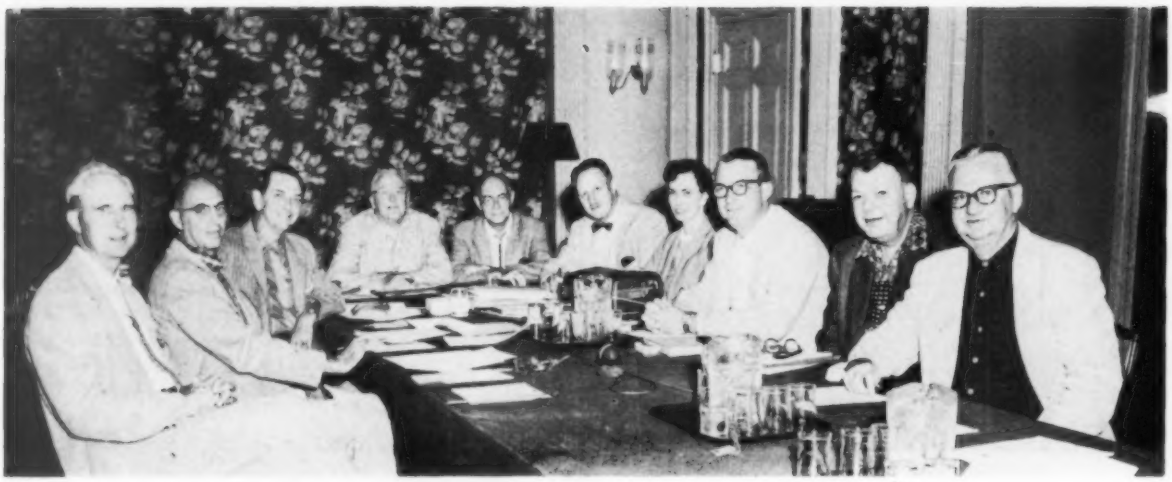
Another control console at the loading station operates the 9 gravel recovery and loading conveyors, including the five tunnel feeders, and the flop gate to the carloading conveyor.

In the design of the electrical system, the maze of cables and wires found in many plants was eliminated through the use of a power distribution system following modern indoor practices. This system can be readily and neatly expanded. Public utility power received at 13,200 v. is stepped down to 2,400 v. for direct service to the dredge and to plant substations. Secondary 480-v. and 120-v. feeders and control wiring are carried to the point of use in expanded metal cableways on horizontal runs and in steel enclosed risers on vertical runs. These are supported by the equipment or conveyor structures. At the connections to motors, lights, or starters the wiring leaves the trough and enters flexible or rigid conduit.

A bank of three 75-kv-a. transformers on poles at the washing and screening plant reduces the 2,400-v. current to 480 v. This goes to a circuit breaker at ground level. Three 50-kv.-a. transformers at the center of the stockpiling tower, followed by a circuit breaker, serve the stockpile reclaiming and loading system.

The 2,400-v. current for the dredge pump motor is carried on short poles fastened to the pipeline. Transformers on the dredge reduce to lower voltages for smaller motors, lights, etc.

A feature of the plant office building is the use of electric baseboard heating panels installed around the perimeter of each room. This building is also well insulated.



# Plans for Expanded Services Discussed by N.C.S.A. Directors

By WALTER E. TRAUFFER

Norman E. Kelb, president of the National Crushed Stone Association, with Joseph E. Gray, engineering director (left); and Beatrice Gay, assistant secretary (right).

ANOTHER ON THE SPOT REPORT

THE summer meeting of the board of directors of the National Crushed Stone Association was held July 18 and 19, 1957, at The Homestead, Hot Springs, Va. The Executive Committee of the Manufacturers Division of N.C.S.A. also met, on the morning of July 18. This popular convention site is, of course, almost without competition, combining as it does great scenic beauty and every comfort and diversion to be expected of an internationally famous resort. The attendance was excellent, and many members brought their wives and families. May important matters of association business were discussed at the meetings. It was also reported that since the last meeting the membership of N.C.S.A. had increased to a total of 162 member companies; the Manufacturers Division increased to a total of 116 member companies.

Attending the meeting of the Executive Committee of the Manufacturers Division were: Norman E. Kelb, N.C.S.A. president; Richard D. Ketner (General Electric Co.); Irwin T. Deister (Deister Machine Co.); Chairman Wayne N. King (W. S. Tyler Co.); J. R. Boyd, executive director of N.C.S.A.; N. A. Rundquist (Pioneer Engineering); Beatrice Gay, N.C.S.A.; L. A. Eiben (Northern Blower Co.); N. E. Collins Jr. (Atlas Powder Co.); and B. R. Maloney (E. I. du Pont de Nemours & Co.).

**Coming Conventions** One of the surprises of this meeting was the nearly unanimous decision of the board to hold the 1959 annual convention in Miami Beach, Fla., instead of in New York City, as originally planned. The Americana Hotel will again be the headquarters, and the date, sometime in January, will be announced later. This change was made because the 1957 convention at the Americana was such a success, with excellent attendance and a good distribution by companies and geographical areas. The 1958 convention and machinery exposition, of course, is being held at the Conrad Hilton, Chicago, February 17, 18, and 19. The 1958 summer directors meeting will again be held at The Homestead, Hot Springs, Va., on July 17 and 18.

With regard to the 1958 convention in Chicago, it was reported by Oscar E. Benson, chairman of the convention arrangements committee, that the popular practice of having a public social room in the evening will be continued. There will be a party on Monday, the opening night. The replacement of the usual banquet on Wednesday night by a party was so popular in Miami Beach that it was decided to continue this practice. This year the party will be in the Hilton ballroom, and dinner will be followed by entertainment and dancing. Tickets for these affairs will be on sale in advance.

**Executive Director** J. R. Boyd, executive director of N. C. S. A., gave his usual complete report on the affairs of the association, which are becoming more complex each year. In addition to the routine office and administrative work, this includes a wide variety of other activities, including preparations for various sessions, attendance at many outside meetings and conferences, promotional activities, etc.

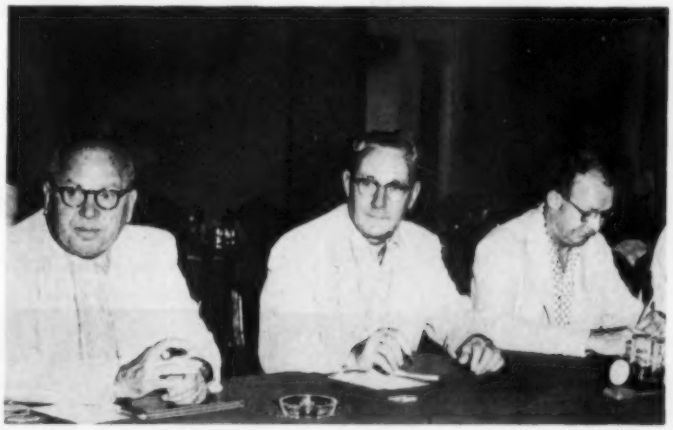
According to Mr. Boyd, Bill N. Southworth was to join the N.C.S.A. staff on August 1, to replace Richard Prewitt, who resigned. His education and experience were described as excellent for association work. Mr. Boyd also reported on the financial status of N.C.S.A.

**Engineering Director** In his first report to the N.C.S.A. board of directors as engineering director, Joseph E. Gray described the last years and probably the next as years of transition in several respects. The huge highway program has brought about a tremendous search for sources of acceptable aggregate, the erection of new plants, and the expansion of existing plants. These are creating increased competition among producers of aggregates, and there is a change in the engineering procedure with respect to materials in some states. Many states are rewriting their specifications; and this is a period of review with respect to the quality requirements for aggregates and a state of change with respect to the relationships and personalities involved in the acceptance of aggregates. Mr. Gray urged all producers to be alert to these developments.

The work of the N.C.S.A. laboratory, said Mr. Gray, is divided into two classifications: service testing for members, and research.

"*Service testing* consists of a laboratory investigation of a particular problem of a member producer and is not routine testing for compliance with specifications unless there is reason to question the validity of reported test results. This service testing may or may not have general application to the industry other than building up a vast background

Three of the directors at the meeting were: Emil Berry (Jefferson County Stone Co.); Alfred N. Foley, (West Roxbury Crushed Stone Co.); and Charles Coburn, (Waukesha Lime & Stone Co.).



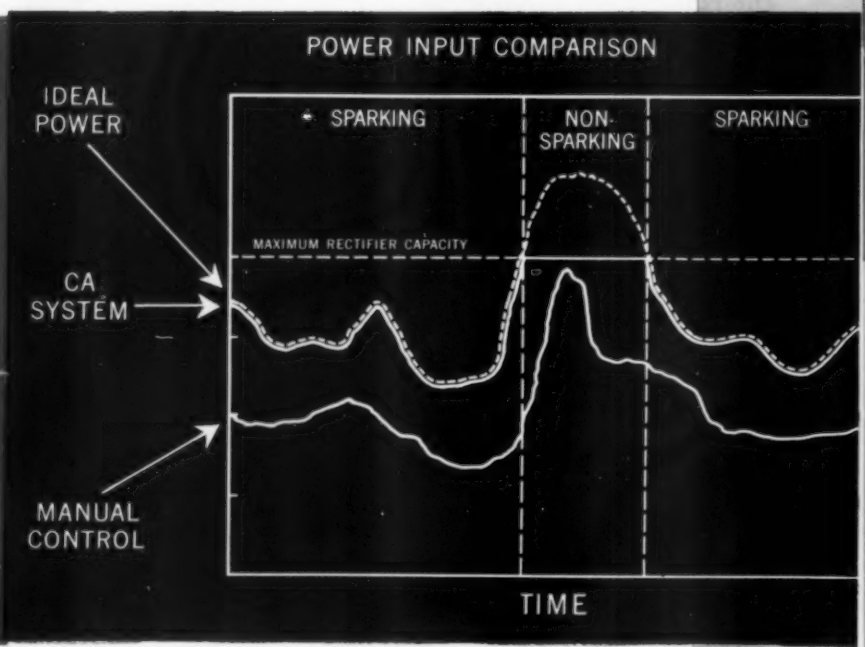
Left to right: Wilson P. Foss III (New York Trap Rock Corp.); Sterling Tomkins; Warren C. Rowe (Rowe Contracting Co.); and Vice-president Oscar E. Benson (General Crushed Stone Co.).

# RESEARCH-COTTRELL'S

# New CA System brings Auto

# to precipitators

Higher "around-the-clock" collection efficiency without any manual adjustments. That sums up the major advantages of Research's new Cottrell Automation System.



*The chart at the left* shows how the CA System provides these advantages. As you know, ideal electrical power input to a precipitator is not constant. It varies with changes in gas composition, temperature, rate of flow and humidity, as well as characteristics of the dust, such as size, electrical resistivity and extent of build-up on the electrodes. With conventional controls, manual adjustments cannot keep pace with these changing conditions. This difference between *ideal* electrical power and *actual* power input, under manual control, is shown in the chart. This

# -mation

difference means lower collection efficiency.
The fast acting electronic circuits of the CA System provide the best practical approach to ideal electrical power. During periods of sparking, electrical power input is controlled by the optimum sparking rate, which can be easily pre-set to any value between 0 and 500 sparks per minute. Under some conditions power input would have to be increased beyond the capacity of the electrical equipment in order to maintain this optimum sparking rate. During such periods the power input is governed by the *capacity* of the electrical equipment. This condition is shown in the center vertical section of the chart.
For more information on this new automation development write for your copy of Bulletin CA. It has a detailed description of how the Cottrell Automation System works and how higher "around-the-clock" collection efficiencies and lower operating costs are obtained.

**Research-Cottrell**

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RC-1

of experience for the engineering staff which aids in the study of new problems. A case in point is that of slipperiness of pavement surfaces. First, laboratory investigations were made to develop a method of test. Next, a co-operative series of tests was made with a state highway research agency, from which it was indicated that field conditions could be duplicated and relative slipperiness could be measured. In the last year, two members had the problem of overcoming slipperiness in their bituminous concrete. Through the laboratory investigations it was possible to indicate not only how to reduce slipperiness but also to assist in determining the economical solution to the problem."

Mr. Gray also presented an impressive list of the major projects of service testing in the last year. Included were such projects as investigation of the relative stability and durability of limestone and crushed gravel; studies of the cause of cracking of precast concrete; test on cores for the future development of a quarry; gradation studies on combining aggregates for graded aggregate base material.

*Research*, Mr. Gray noted, encompasses those laboratory studies which are initiated to develop facts for the good of the entire industry. One of the projects under way is a study of the effect of flat and elongated pieces in surface treatment stone. Another is a study to develop data on the effect of maximum size of aggregate on stability of bituminous concrete. He also described co-operative research projects with highway departments, public works commissions, technical groups, universities, etc., and told of attending and addressing many such groups.

Mr. Gray also mentioned the exhaustive search made to find a new field engineer who would meet the three basic requirements of (1) an engineering education, (2) experience in materials, and (3) a willingness to travel a large part of the time. The man chosen, he said, is Howard M. Bixby, an engineering graduate of the University of Maryland who has had extensive highway experience throughout this country and in Central America.

**Engineering Consultant** A. T. Goldbeck, retired engineering director, and now engineering consultant to N.C.S.A. stated that in this new capacity he first tried to ascertain how he could best serve the industry. Slipperiness of pavements was selected as the most important problem, and he reviewed the exhaustive research and tests made on this subject in the N.C.S.A. laboratory over the years. In further pursuing this problem Mr. Goldbeck consulted with other leading authorities in order to determine procedures to follow. Much of his time is also devoted to attendance and appearances at various industry and technical meetings, and to consultations with producers and members of the staff. He also mentioned the development of an improved method of post-tensioning concrete pavements.

**Committee Reports** Warren C. Rowe, chairman of the Subrogation Committee, said that the work already done on subrogation, which has been fully covered in these pages, has greatly reduced the number of cases. The guide booklet prepared by the insurance companies for claim adjusters and others has been sent out to thousands, and the response has been very gratifying. According to Mr. Rowe, the insurance companies are now working together on this problem; and the result has been a sharp reduction of claims, with a resultant saving in legal fees for producers.

Arthur Goff reported on the progress being made on the new cost accounting manual and he urged more members to co-operate by sending in requested information.

Wilson P. Foss III reported on the activities of the public relations committee. He pointed out the close connection between public relations and the zoning problem and urged that this subject be given adequate attention at the next convention. Every producer, he said, will eventually be faced with the zoning problem because the previous classification of land, the payment of taxes on it as industrial property, etc., will not prevent its being reclassified for quarry use as has been demonstrated in the state of New York.

Horace C. Krause, reporting for the percentage depletion committee, said that important cases on fine grinding, the cut-off point, etc., are coming up soon.

**Manufacturers Meeting** The meeting of the N. C. S. A. board was preceded by a meeting of the executive committee of the Manufacturers Division. After the members answered to the roll call Wayne W. King, chairman. also gave a brief report. President Norman E. Kelb of N.C.S.A. extended greetings to the committee and told of the expanding services being provided for the manufacturers, as well as for the members. J. R. Boyd, executive director of N.C.S.A., said in his report that the demand for the New York Trap Rock Corporation's public relations film *From Mountain to Main Street* has made it necessary to secure a second copy. This film is available free of charge to any member producer or manufacturer.

In reporting on the February, 1958, Machinery Exposition, Mr. King stated that the demand for exhibit space was brisk, but that many had not yet applied in spite of the deadline, August 1. He was sure that the show would be the biggest in N.C.S.A. history. The space allocation committee will meet in Chicago on September 12 and 13.

Chairman Irwin F. Deister of the Awards and By-Laws committees proposed that in the future retiring chairman of the Executive Committee receive a plaque instead of a gavel in appreciation of their services. A number of amendments to the bylaws and some changes were accepted, to be voted on by the manufacturers' board of directors.

Chairman Richard D. Ketner of the Membership Committee mentioned that since January the division had gained three new members and lost three others. The total membership remains 116.

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### Texas Portland Cement Co. Holds Plant Open-House

On June 22 the directors, officers, and employees of Texas Portland Cement Company were hosts to stockholders and other visitors at the firm's new $6,000,000 plant near Orange, Tex. (These facilities have been in operation since March.) The all-day open-house gave guests an opportunity to inspect the $6,000,000 plant, which has been under construction over a period of 18 months.

In addition to the kiln already in operation, a second (larger) unit is now being readied for installation. This new kiln will increase the original annual capacity of 70,000 bbl. more than 5,000 bbl. per day.

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India's cement production in the first four months of the current year was 1,834,000 tons. If the present production rate is maintained, the cement production during the current year is expected to reach 5,504,000 tons, an increase of 576,000 tons over last year's figure.

# The Effect of Phosphate In Portland Cement Clinker

By HAROLD H. STEINOUR
Assistant to the Director of Research
Portland Cement Association, Chicago

## SYNOPSIS

Recent foreign experimental studies relating to the effect of phosphate in portland cement clinker are reviewed, together with earlier (American) work. Nurse has presented strong evidence that the $P_2O_5$ is in solid solution as a calcium phosphate in the dicalcium silicate phase, and that in lime-saturated clinker the approximate composition of this phase is 7 percent $P_2O_5$, 26.5 percent $SiO_2$, 66.5 percent CaO.

Data of other investigators are found to be in sufficient agreement with these findings, and it is concluded that equations developed by Nurse provide a rational basis for design of raw mix. Phosphate in clinker reduces both the lime limit and the maximum possible tricalcium silicate content; however, with proper mix design, 2 percent $P_2O_5$ in clinker can apparently be tolerated, and under suitable circumstances the amount can be considerably higher. This is indicated by physical data from several sources, which show good setting times and good strengths.

Thus, the picture seems promising for development of raw materials containing moderate amounts of phosphate. Caution is still necessary, however, in view of variables and characteristics not yet fully investigated.

## PART I

MOST portland cement clinkers contain at least a few hundredths of a percent of phosphorus pentoxide, $P_2O_5$. This oxide is not usually reported in the chemical analysis, but Miller and Manson (20)*, who determined the minor components in 122 commercial cements from 85 mills, found 0.05 percent $P_2O_5$, or more, in all but 19 of these cements. In 21 cases, the amount was 0.2 percent or higher, the largest percentage being 0.37. Such amounts are generally disregarded, and considered to be of little consequence.

However, phosphate occurs in significant percentages in various limestone deposits (10), and an occasional cement has been produced, or experimented with, having 1 or 2 percent $P_2O_5$, or more. Phosphate in these amounts has gained the reputation of making clinker harder to burn to low free lime content, and of making the resultant cement slow hardening. Slow or erratic setting has also been reported. Until very recently, however, nothing has been definitely known regarding the chemical combination of the phosphate in clinker. For these reasons, there has been understandable reluctance on the part of cement producers to utilize limestone containing much phosphate.

Within the last four years, however, basic work has been reported that has greatly clarified the situation. This work has been done abroad, and has been reported in English and other European periodicals. Some of it is briefly considered in the 1955 edition of Bogue's *Chemistry of Portland Cement* (2). In the present article these important foreign studies are reviewed in some detail, together with previously unpublished American work. The chemical combination of $P_2O_5$ in clinker receives attention first, after which its bearing on the physical properties of cements is considered. Physical data from several sources are presented.

### EARLY VIEWS

The following brief notes provide a degree of historical perspective. Huber (16) in 1930 obtained a U.S. patent covering production of portland cement from phosphate-containing raw materials by adding extra iron oxide to the mix. He believed that the $P_2O_5$ combined as iron phosphate, $Fe_2O_3.P_2O_5$, and that the iron oxide should always be in excess of the amount so combined in order to provide adequate flux.

A more common assumption has been that the phosphate is present in the clinker as tricalcium phosphate, $3CaO.P_2O_5$. This view was held, for example, by Martin (19).

In 1883, however, there had been discovered (6,1) in Thomas (basic Bessemer) slag a phase having the composition $5CaO.P_2O_5.SiO_2$, since called silicocarnotite. Moreover, in 1937, in basic open-hearth slag, the phase $7CaO.P_2O_5.2SiO_2$ was reported (21,1), and has been named nagelschmidtite. These compositions can be written as $(3CaO.P_2O_5).(2CaO.SiO_2)$ and $(3CaO.P_2O_5).2(2CaO.SiO_2)$, respectively; that is, as double salts of tricalcium phosphate and dicalcium silicate. However, it has since become rather well established (1, 4, 5, 28) that both phases are simpy solid solutions between the two compounds, and thus can vary considerably in composition. These developments suggest, of course, that the phosphorus in portland cement clinker might be present there as tricalcium phosphate in solid solution in dicalcium silicate. It should be mentioned, however, that tetracalcium phosphate, $4CaO.P_2O_5$, was also found in Thomas slag (cf. 1).

### PHASE EQUILIBRIUM STUDIES BY NURSE

In December, 1952, R. W. Nurse of the (British) Building Research Station published an experimental study (22) that appears to establish approximately the equilibrium phase relations in portland cement clinker that contains phosphate. From the

* Numbers in parentheses indicate references. See page 101.

results obtained, Nurse devised equations for computing cement compounds, making due allowance for the amount of phosphate and its state of combination. The approach used in attacking the problem was so logical, and the result so evidently successful, that apparently a rational basis has finally been provided for designing mixes that contain phosphate.

The recent studies by other investigations were made under different conditions, for which allowance has to be made in comparing with Nurse's work. For the most part, these others seem to have been unfamiliar with his report, and to some extent they reach divergent conclusions. Actually, there is little fundamental conflict in the data, and little reason to question the basic reliability of Nurse's conclusions. The other studies do, however, provide some amplification of the picture with respect to altered conditions. Comparison is made with Nurse's work at each step of the present survey.

**Nurse's Results** In essence, what Nurse found regarding clinker composition is presented in Table 1. The phases there represented by use of the abbreviated symbols for cement oxides are the familiar ones,[1] except Pss, which represents the phosphate-containing phase, and is a solid solution (ss). The $C_2S$ of column one is also a part of the solid solution, so in that case the over-all solid solution composition is given by the percentage of Pss plus that of $C_2S$. This is indicated by the brace. As shown at the foot of the table, the composition of Pss may be represented on the mole basis as 1 $C_3P$: 8.95 $C_2S$: 3.15C. This mode of representation was chosen (by the present writer) as perhaps best indicating the physical properties to be expected.

The significance of Table 1 may be explained as follows: As is familiar to the cement chemist, $Fe_2O_3$ and $Al_2O_3$ combine fixed amounts of CaO in $C_4AF$ and $C_3A$, and the remaining CaO and the $SiO_2$ react to form $C_2S$ and $C_3S$. As the percentage of CaO in the mix is increased, the ratio of $C_3S$ to $C_2S$ increases until no more $C_2S$ remains. Further increase in CaO then gives free CaO at equilibrium.[2] The three columns of Table 1 would represent this course of events if Pss were not shown. The presence of $P_2O_5$ simply means that Pss will also form and will withhold, from other reaction, fixed amounts of CaO and $SiO_2$. The remaining CaO and $SiO_2$ react in the usual way to form $C_2S$ and $C_3S$, except that the $C_2S$ goes into solid solution with the Pss. Increase in CaO has the effects explained above.

At all lime contents up to lime saturation, the percent of $C_3S$ will always be less when $P_2O_5$ is present. Formulation of Pss as 1 P: 6.15 $C_3S$: 2.8 $C_2S$ shows the extent of this decrease, on the mole basis. In weight percent, the decrease in $C_3S$ is 9.9 times the percent $P_2O_5$. Nurse points to this reduction in $C_3S$ as the explanation of the marked effect that $P_2O_5$ has been reported to have on the rate of hardening of cement.

Moreover, when $P_2O_5$ is present, lime saturation occurs at lower lime content. This follows from the fact that the ratio of CaO to $SiO_5$ in Pss is less than in $C_3S$. Indeed, each percent of $P_2O_5$ reduces the CaO limit by 1.1 percent.

Thus, a producer operating at what would be a feasible lime content for normal mix will be operating closer to the lime limit if $P_2O_5$ is present, and yet the product will contain less $C_3S$. If, as Martin (19) advised, he allows for formation of $3CaO.P_2O_5$ the reduction in $C_3S$ will not be as great but he may exceed the lime limit. Thus, Nurse's work appears to go a long way toward explaining difficulties that have been encountered, and shows how correct design of mix might eliminate or minimize these troubles.

The following equations for computing clinker constitution when $P_2O_5$ is present are as presented by Nurse, except that a slight error in one constant has been corrected,[3] and instead of using special symbols, the percentages of oxides are represented by the oxide formulas:

$$C_4AF = 3.04\ Fe_2O_3 \quad (1)$$

$$C_3A = 2.65\ Al_2O_3 - 1.69\ Fe_2O_3 \quad (2)$$

$$C_2S = 4.07\ CaO - 7.60\ SiO_2 - 6.72\ Al_2O_3 - 1.43\ Fe_2O_3 - 9.9\ P_2O_5 \quad (3)$$

$$\left.\begin{array}{l} C_2S = 8.60\ SiO_2 - 3.07\ CaO + 5.07\ Al_2O_3 + 1.08\ Fe_2O_3 - 3.4\ P_2O_5 \quad (4) \\ Pss = 14.3\ P_2O_5 \quad (5) \end{array}\right\} ss$$

These equations are the same as apply when $P_2O_5$ is absent, except for the $P_2O_5$ terms. Nurse gives an equation (the sum of 4 and 5) for directly computing the total $C_2S$ solid solution, but its use is risky since it can obscure a negative value of $C_2S$ which would indicate an over-limed mix. When $C_2S$ does come out negative, the quantity can be divided by 3.07 to obtain the equilibrium amount of free CaO, which can then be used as a correction in computing $C_3S$.

Equation 3 shows the effect, already mentioned, of $P_2O_5$ in severely reducing the amount of important constituent $C_3S$. The indication is that more than 2.5 or 3 percent of $P_2O_5$ may not be practicable.[4]

**Nurse's Technique** To establish the phase relations, Nurse used simple methods coupled with a knowledge of phase theory. Besides the usual chemical analyses for oxide composition, the analytical or determinative procedures were the free lime test (ethylene glycol method), and microscopic observation.

Early in the study, clinkers with $P_2O_5$ contents up to 5 percent were prepared and examined. The $P_2O_5$ occurred in the limestones, which were mixed in various proportions with the clays. By application of the free lime test, it was possible to determine when lime saturation was reached. Several different lime-saturated clinkers were thus produced.

[1] C = CaO, S = $SiO_2$, A = $Al_2O_3$, F = $Fe_2O_3$. By analogy, P is here used for $P_2O_5$, but Pss is a hybrid designation indicating simply a solid solution containing $P_2O_5$. Computation of the iron-containing phase as $C_4AF$ is a considerable approximation under some circumstances, but remains the common practice.

[2] The equilibria discussed are those that would be obtained under slow cooling to the point of complete crystallization; the "lime saturation" of Table 1 is not the "practical lime limit" for rapid cooling.

[3] In the equation for $C_2S$, 5.07 replaces 5.10.

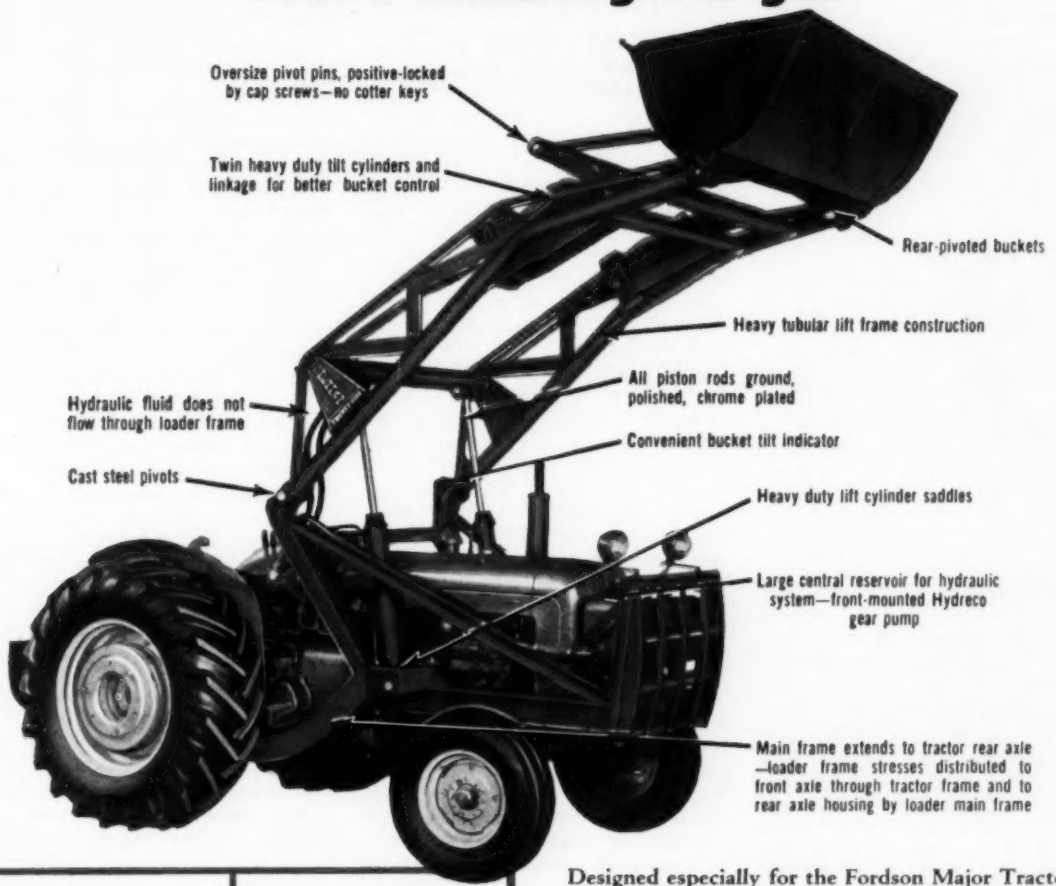
[4] Cf. Lea and Desch, *"The Chemistry of Cement and Concrete,"* 2nd edition, 1956, p. 78.

**TABLE 1—CLINKER CONSTITUTION ACCORDING TO *NURSE* WHEN PHOSPHATE IS PRESENT**

| Below Lime Saturation | At Lime Saturation | When Lime Is In Excess |
|---|---|---|
| $C_4AF$ | $C_4AF$ | $C_4AF$ |
| $C_3A$ | $C_3A$ | $C_3A$ |
| Pss, $C_2S$ (ss) | Pss | Pss |
| $C_3S$ | — | — |
| $C_3S$ | $C_3S$ | $C_3S$ C |

Pss amounts to 14.3 × % $P_2O_5$
Pss consists of 7% $P_2O_5$, 26.5% $SiO_2$, 66.5% CaO or 1 $C_3P$: : 8.95 $C_2S$ : 3.15 C
Pss reduces amount of $C_3S$ by 9.9 × % $P_2O_5$

# THE SHERMAN LOADER Gives More Bucket Capacity . . . More Reach . . . More Loading Height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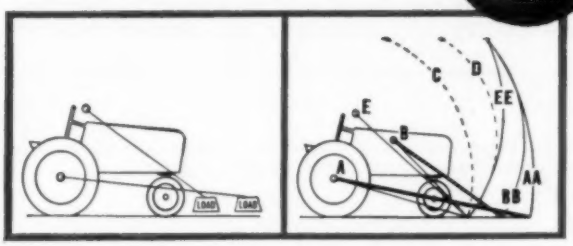
Main frame extends to tractor rear axle —loader frame stresses distributed to front axle through tractor frame and to rear axle housing by loader main frame




On any loader, the front wheels serve as a fulcrum to keep the load raised. The heavier the load or the farther out it is, the greater the weight on the wheels, with consequent shorter tire life, harder steering, and strain on the tractor frame.

Thus, loaders using pivot point A or B have practically no loading height (arcs C and D would rise over the tractor) unless their lift arms are extended well ahead of the tractor to get arcs AA and BB.

On the other hand, the Sherman pivot point E allows the load to be close to the front wheels assuring maximum working height (arc EE) with minimum strain on the tractor and front wheels.

*Mfgd. for us by Johnson Hydraulic Equipment Co., Minneapolis, Minn.

Designed especially for the Fordson Major Tractor, the Sherman Front End Loader is built to handle the heaviest jobs. Its design transmits the load to the rear wheels for maximum traction and performance with minimum strain on the tractor. The Sherman gives you greater load, lift, and breakaway capacities than any comparable unit, dumping height and reach equalled by none, plus exclusive features that make it the most practical and profitable piece of equipment you can own. Ask your Ford Tractor Dealer for an on-the-job demonstration or write for Bulletin 4672.

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Microscopic observations revealed only the normal clinker phases, but "in clinkers of high $P_2O_5$ content the ratio of $C_3S$ to $C_2S$ was lower than would otherwise have been expected." It thus appeared that the $P_2O_5$ was in the $C_2S$ phase, as prior theory suggested. Moreover, it was recognized (from phase theory) that in lime-saturated clinkers this phosphate-containing $C_2S$ phase would be of fixed composition. The problem was, therefore, to determine this fixed, limiting composition (Pss).

A preliminary indication of the composition of Pss was obtained by burning a mixture of CaO, $SiO_2$, and $P_2O_5$ estimated to contain excess CaO. A burn to apparent equilibrium at 1400 deg. C. gave a product containing 10 percent free CaO. Microscopic observation showed that the remainder was solid solution plus some $C_3S$. Allowance for the free CaO showed that this remainder contained approximately the same percent of $SiO_2$ as $C_3S$ alone, which is 26.3. This was fortunate, and indicated that the $SiO_2$ content of the solid solution must be about the same.

To check on this, and to find out whether the result would be the same in the presence of the other clinker constituents, calculations were made on the lime-saturated clinkers previously prepared. After calculation of the $C_4AF$ and $C_3A$, the remaining CaO, $SiO_2$, and $P_2O_5$ were calculated to a total of 100 percent. The percentages of $SiO_2$ were found to be about 26.5, and that figure was taken as the amount in Pss, which was concluded to be composed solely of CaO, $SiO_2$, and $P_2O_5$.

To find the $P_2O_5$ content of Pss, clinkers calculated to have 10 percent each of $C_4AF$ and $C_3A$, and 26.5 percent $SiO_2$ in the residue, were made from pure oxides by firing for 1 hour at 1400 deg. C. and cooling slowly. The $P_2O_5$ contents, as calculated for $CaO\text{-}SiO_2\text{-}P_2O_5$ residue were increased in 1 percent steps. Microscopic examination showed that at 7 percent $P_2O_5$ the $C_3S$ phase disappeared. This established the composition of Pss as approximately 7 percent $P_2O_5$, 26.5 percent $SiO_2$, 66.5 percent CaO.[5]

As to the solid solution in clinkers not saturated with lime, this was assumed to be made up of Pss plus the additional $C_2S$, because microscopical measurement appeared to confirm the conclusion. That is, measurement of the amounts of phases in three specially prepared clinkers agreed well with calculations made using equations 1 - 5.

[5] Calculations give approximately this same composition as the residue after subtraction of $C_4AF$ and $C_3A$ in the two lime-saturated clinkers of highest $P_2O_5$ contents which Nurse prepared originally. Since Nurse says that some of these clinkers contained no $C_2S$, this outcome appears to be a further check on the composition of Pss.

## PHASE STUDIES BY HARTMANN AND HAEGERMANN

In March, 1953, a report of experimental studies on the systems $CaO\text{-}P_2O_5\text{-}Al_2O_3$ and $CaO\text{-}P_2O_5\text{-}SiO_2\text{-}Al_2O_3$ was published by German investigators, Hartmann and Haegermann (15). The authors' interpretation of the latter system is at variance with Nurse's conclusions, but actually, as will be shown, the data are in reasonable accord with his findings.

The study of the system $CaO\text{-}P_2O_5\text{-}Al_2O_3$ was confined to tests in which various proportions of tricalcium phosphate and $C_3A$ were heated at 1535 deg. C., at which temperature $C_3A$ when heated alone decomposes yielding solid CaO and a melt. The heated preparations were rapidly chilled, and the amounts of free CaO were found to fall below the amounts freed in the $C_3A$ decomposition by just the quantities needed for formation of tetracalcium phosphate, $4CaO.P_2O_5$. It thus appeared that no combination of $P_2O_5$ and $Al_2O_3$ had occurred. (More recently, Stone, Egan, and Lehr (25) have reported a study of the system $CaO\text{-}P_2O_5\text{-}Al_2O_3$ which also disclosed no calcium aluminum phosphate.)

Hartmann and Haegermann's study of the system $CaO\text{-}P_2O_5\text{-}SiO_2\text{-}Al_2O_3$ centered around a base composition W which was heated at 1550 deg. C. and rapidly chilled. The composition was such that slow cooling would have given 58.3 percent $C_3S$, 16.5 percent $C_2S$, and 25.2 percent $C_3A$. However, the rapid cooling was believed to have frozen the equilibrium, giving $C_3S$, a frozen melt, and 0.91 percent free CaO (as found by analysis).

This clinkered W was finely ground, and portions were mixed with successively increased amounts of tricalcium phosphate, $3CaO.P_2O_5$. These mixtures were then heated and cooled, presumably according to the same schedule as for W originally although this is not stated. The products were analyzed for free CaO, using the glycerol-alcohol method. The quantities found are shown by the experimental curve of Figure 1. Indeed, the authors extended the curve, causing it to drop below the abscissa by adding extra CaO, which entered into combination.

The authors' interpretation of this curve is as follows: The preparations with the smallest proportions of $3CaO.P_2O_5$ produced $4CaO.P_2O_5$, thus using up the free CaO that was present initially (in W). But, since proportions of $3CaO.P_2O_5$ greater than 3.5 percent released CaO, these did not form $4CaO.P_2O_5$. Instead, they decomposed some of the $C_3S$, producing free CaO and $C_2S$, then entered into solid solution with all of the latter. Thus, solid solutions of widely varied composition were inferred. At the higher percentages of $3CaO.P_2O_5$, where the free CaO decreased, the decomposition of

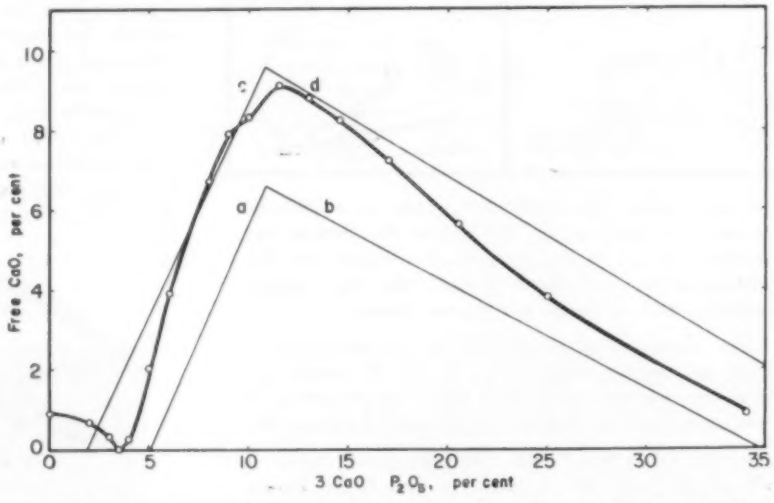


Fig. 1—Free lime data of Hartmann and Haegermann for mixtures of tricalcium phosphate and composition W burned at 1550 deg. C. Comparison with Calculated Curves (a b) and (c d).

$C_3S$ became less, and approached zero. Lime added to preparations containing still higher percentages of $3CaO.P_2O_5$ became combined as $4CaO.P_2O_5$. The authors concluded that small amounts of $P_2O_5$ in cement clinker (less than 3.5 percent) would form $4CaO.P_2O_5$.

These conclusions are highly suppositious and open to serious question. In particular, the wide variation in solid-solution composition that is assumed is, in this case, contrary to the *phase rule*. As long as residual $C_3S$ is present, the condensed phases at the reaction temperature are apparently $C_3S$, solid solution, free CaO, and melt. At equilibrium at constant temperature, a four-component system of this number of phases is invariant. The solid solutions in the frozen equilibria should thus have been of one fixed composition. At the lower percentages of $P_2O_5$ it would seem, also, that solid solution should have formed. At these low percentages, the authors assumed $4CaO.P_2O_5$ because CaO was combined rather than released. However, as shown below, this difference can easily be accounted for in other ways.

**Comparison with Nurse's Results** To apply Nurse's findings to the preparations investigated by Hartmann and Haegermann the solid solution was taken to have the composition of Pss given in Table 1. Uncertainty in the calculations arose, however, because of the quick cooling that the preparations had received. Hartmann and Haegermann, in making their calculations, assumed that the tricalcium phosphate had only $C_3S$ and free CaO with which to react. This treatment assumed that the equilibrium melt produced in the mixtures was the same as that produced in pure W, and did not react during cooling. It seems probable that these assumptions are not wholly correct, and *some* modification must be introduced to account for initial formation of solid solution without release of any CaO. What is needed is some $C_2S$, available for reaction.

For a first calculation, it is simplest to assume that the high temperature equilibrium was not frozen at all. On that basis, the composition W would have furnished 58.3 percent $C_3S$, 16.5 percent $C_2S$, and 25.2 percent $C_3A$, as previously noted. (The 0.91 percent free CaO found in W is here treated as combining during the reheating.) Formulation of Pss as 1 $C_3P$: 3.15 $C_3S$: 5.8 $C_2S$ shows how much $3CaO.P_2O_5$ is required to use up the $C_2S$ without producing free CaO. Additional $3CaO.P_2O_5$ then reacts with the remaining $C_3S$. The result is the rising (a) section of the lower curve of Figure 1, which ends at the point where no more $C_3S$ remains.

For the continuation of the curve, the down slope (b), it was assumed that the $3CaO.P_2O_5$ in excess of that required for Pss combined with free CaO to form $4CaO.P_2O_5$. This is in accord with previous evidence checked experimentally by Hartmann and Haegermann, showing that an equi-molar mixture of $3CaO.P_2O_5$ and CaO combines at high temperature (1420, 1500-1550 deg. C.), leaving no free CaO.

The fact that the calculated curve, (ab) falls below the experimental one shows that the assumption that quick cooling was without effect is too extreme. Some lesser amount of $C_2S$, such as would result from partially effective quick cooling, would evidently give a better fit. Partly on theoretical grounds (based on crystallization in the system $CaO-SiO_2-Al_2O_3$), $C_2S$ was now taken at 6.33 percent, the corresponding $C_3S$ thus becoming 71.75 percent. This gave the (c) section of the upper curve. Assumed formation of $4CaO.P_2O_5$ gave the (d) section, analogous to the (b) section of the lower curve.

It is evident that the two calculated curves of Figure 1 practically bound the experimental curve, and give a good indication of its course. Indeed, since it is logical to suppose that the cooling effects differed somewhat for the different preparations, the agreement with the calculations based on Nurse's solid solution, Pss, may be considered quite good. Of particular importance is the good agreement between the tricalcium phosphate contents corresponding to the peaks of the curves. For the calculated curves, this content is independent of the amount of $C_2S$, but highly dependent on the composition of the solid solution, Pss.

The data of Hartmann and Haegermann may thus be regarded as providing material support for Nurse's solid solution. Since the rapid cooling evidently did prevent full maintenance of equilibrium during solidification, it is interesting that Nurse's solid solution composition is as applicable as it is. This is especially noteworthy since these burns were made at 1550 deg. C., whereas Nurse burned at 1400 deg. C.

## PHASE STUDIES BY TOROPOV, BORISENKO AND SHIROKOVA

In 1953 Russian investigators, Toropov, Borisenko, and Shirokova, published an investigation (27) of

TABLE 2—FREE LIME DATA OF *TOROPOV* AND *BORISENKO* FOR QUICKLY COOLED CLINKERS CONTAINING PHOSPHATE

| | Base Mixture | | | $3CaO.P_2O_5$ added, | Free CaO | |
|---|---|---|---|---|---|---|
| No. | $C_3S$ % | $C_2S$ % | $C_4AF$ % | % of total | found % | calc.* % |
| 1 | 25 | 75 | 0 | 10 | 0 | 0 |
| 2 | 50 | 50 | 0 | 10 | 0 | 0 |
| 3 | 75 | 25 | 0 | 10 | 3.22 | 3.16 |
| 4 | 40 | 40 | 20 | 15 | 0 | 0.98 |
| 5 | 35 | 35 | 30 | 10 | 0 | 0.24 |
| 5 | " | " | " | 15 | 0 | 0.52 |
| 6 | 30 | 30 | 40 | 10 | 0 | 1.12 |
| 6 | " | " | " | 15 | 0 | 0.05 |
| 7 | 25 | 25 | 50 | 10 | 0 | 0.64 |
| 8 | 70 | 0 | 30 | 1 | 0 | 1.05 |
| 8 | " | " | " | 2 | 0 | 2.10 |
| 8 | " | " | " | 5 | 1.60 | 5.25 |
| 8 | " | " | " | 10 | 7.28 | 9.96 |
| 8 | " | " | " | 15 | 6.60 | 8.41 |

* Equilibrium values, calculated for this report.

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the system tricalcium silicate—tricalcium phosphate. This report was followed, in 1954, by one by Toropov and Borisenko entitled *Reaction of Calcium Phosphate with Clinker Minerals* (26). These Russian studies inject new elements into the picture which add somewhat to the facts disclosed by Nurse and the German investigators.

**Report of 1953** in the 1953 study, the compounds $3CaO.P_2O_5$ and $C_3S$ were mixed in various proportions up to 80 mole percent $3CaO.P_2O_5$. The mixtures were compressed into tablets and introduced into a furnace maintained at 1450 deg. C. Individual tablets were removed at 10-minute intervals, examined microscopically, and analyzed for free CaO by the glycerol-alcohol method. The course of reaction thus indicated was presented in detail for the mixtures containing up to 20 mole percent $3CaO.P_2O_5$. In all these cases the free CaO increased during the first 60 minutes, dropped materially during the next 10 minutes, then increased again, reaching a maximum within about 2 hours. After that, it remained constant.

Microscopic examination during the first 60 minutes revealed $C_3S$, $C_2S$, CaO, $3CaO.P_2O_5$, and small amounts of $4CaO.P_2O_5$. The decrease in free CaO between 60 and 70 minutes was attributed to increased formation of $4CaO.P_2O_5$. At 80 minutes, both $4CaO.P_2O_5$ and solid solution considered to be silicocarnotite ($5CaO.P_2O_5.SiO_2$) were present. After the free lime had become constant, these mixtures made with 2 to 20 mole percent of $3CaO.P_2O_5$ (and 98 to 80 mole percent of $C_3S$) are reported to have contained only residual $C_3S$, free CaO, and silicophosphate solid solution. The free CaO was always less than corresponded to the amount of $C_3S$ decomposed.

To investigate this difference, experiments were made in which silicocarnotite and nagelschmidtite ($7CaO.P_2O_5.2SiO_2$) were heated with calcium carbonate. In each case, 0.3 mole of CaO was taken up by the silicophosphate, giving 5.3 $CaO.P_2O_5.SiO_2$ and 7.3 $CaO.P_2O_5$. 2 $SiO_2$, respectively.

The free lime data for the final products of the $C_3S$-$3CaO.P_2O_5$ mixtures are shown in Figure 2, in which the mole percents of $3CaO.P_2O_5$ have been converted to weight percents (20 mole percent being 25.4 weight percent). For comparison, the curve (ab) shows, in branch (a), the results of calculations based on Nurse's solid solu-

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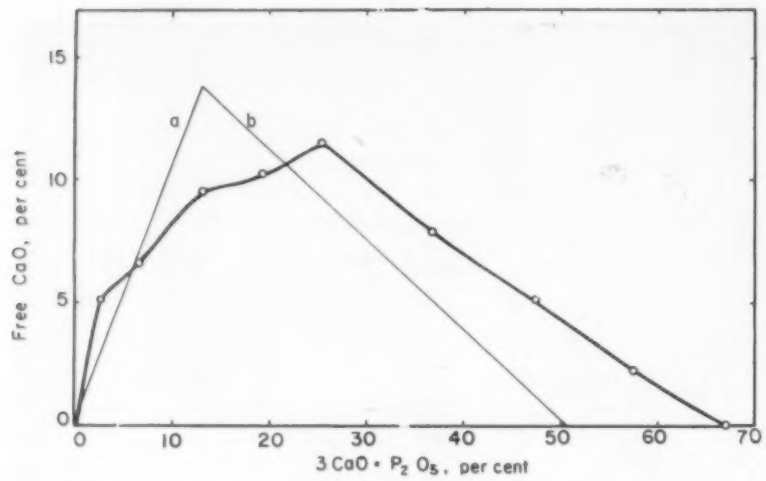


Fig. 2—Free lime data of Toropov, Borisenko and Shirokova for mixtures of tricalcium phosphate and tricalcium silicate burned at 1450 deg. C. Comparison with calculated values (a b).

tion Pss, and, in branch (b), the result of assigning excess $3CaO.P_2O_5$ to formation of $4CaO.P_2O_5$.

A large discrepancy between the two curves is evident. However, it is also evident that thermodynamic equilibrium was not reached in these experiments even though the free lime values did attain constancy. For equilibrium, the phase rule requires that the solid solutions should have been the same in all cases. From this it follows that the curve from the origin to the point where the $C_3S$ has all reacted should be a straight line. Since it is not, equilibrium was not attained, and the discrepancy between the two curves does not argue against Nurse's solid solution composition. There is, indeed, qualitative support for Nurse in that the smaller percentages of $P_2O_5$ did enter completely into calcium silicate solid solutions. It is also significant that these solid solutions, like Nurse's, contained more CaO than corresponds to simple solution of $3CaO.P_2O_5$ in $C_2S$.

The lack of attainment of equilibrium may be attributed to the fact that presumably no melt is formed when mixtures of $C_3S$ and $3CaO.P_2O_5$ are heated at 1450 deg. C. Nurse apparently *did* attain equilibrium in his one similar preparation. However, he did not start with already formed $C_3S$, and this may well have been an advantage.

**Report of 1954** In their 1954 paper Toropov and Borisenko report several further studies. Binary mixtures containing up to 15 weight percent of $3CaO.P_2O_5$ were made with $C_2S$, $C_4AF$, and $C_6A_2F$. The $C_2S$ mixtures heated at 1450 deg. C. gave solid solutions. The $C_4AF$ mixtures heated at the same temperature and quickly chilled gave a single homogeneous phase; but slow cooling caused separation into apparently the original constituents, $C_4AF$ and $3CaO.P_2O_5$. No free lime was found in either the chilled or slow-cooled specimens. The $C_6A_2F$ mixtures showed no interaction when heated at 1300 deg. C. Mixtures heated at 1500 deg. C. and chilled gave a single homogeneous phase. When slowly cooled, these preparations appeared to give $C_5A_3$, $3CaO.P_2O_5$ and iron-containing phase.

These studies tend to confirm Nurse's conclusion that phosphate does not react with the iron and alumina in portland cement.

Other studies, in which tricalcium silicate was involved, are represented in Table 2. The preparations were all heated at 1450 deg. C. for 2 hours. Cooling was rapid, apparently in all cases, although this is specifically stated only for the compositions involving base mixtures 4 through 8. The calculated free CaO values shown in the last column of the table were calculated for the present report by use of Nurse's equations.

The first three experiments involved only one amount of $3CaO.P_2O_5$, namely 10 percent of the total mix.[6] These three tests involving only $C_3S$, $C_2S$, and $3CaO.P_2O_5$ in the mix are in fine agreement with expectations from Nurse's work.

In other experiments, each base mix was tested with amounts of $3CaO.P_2O_5$ corresponding to 1, 2, 5, 10, and 15 percent of final mix. However, with the exception of the preparations involving base mix 8, no free lime was found. In most cases, this agrees with expectations from Nurse's work. Only for some of the mixtures containing 10 and 15 percent $3CaO.P_2O_5$ would any free lime be expected. In all such cases the calculated amounts have been entered in the table. These amounts, for preparations involving base mixtures 4-7 are fairly small, the largest being 1.12 percent. Such discrepancies need arouse no great concern.

However, as one progresses to the experiments involving base mix 8, the discrepancies become larger, and call for discussion. It is to be recalled that these preparations were quickly cooled; they were small specimens that were removed from the hot furnace while it was apparently still at the firing temperature. Over the important range down to the temperature of complete solidification, this is more rapid-cooling than is ordinarily encountered in practice, and it was more rapid than the cooling practiced by Nurse. He took special pains to cool slowly over this range when determining the composition of Pss, and he set up his equations on the basis of complete maintenance of equilibrium during crystallization. It would be surprising if this difference in cooling did not have significant consequences.

Even in the absence of phosphate, quick cooling alters the relative amounts of $C_2S$ and $C_3S$. With phosphate present, and affecting the melt composition, not only may the relative amounts of $C_2S$ and $C_3S$ be altered but quick cooling may divert some of the phosphate from its equilibrium reaction. Something of the latter nature seems to have happened, for only by making both assumptions, was it found possible to calculate free lime values that agree closely with the experimental ones.

In this connection, it is of interest that the authors concluded that some $3CaO.P_2O_5$ *was* withheld from reaction. They believed that it was retained in the melt at the firing temperature and crystallized therefrom during the rapid cooling. They based this conclusion on two observations: (a) the presence of small point inclusions of a gray substance in the iron-containing interstitial phase, and (b) the fact that the amount of this phase (plus inclusions) increased with increase in

[6] In these three cases, the base mix shown in Table 2 was apparently not made up separately.

the amount of $3CaO.P_2O_5$ in the mix. Perhaps from analogy with the tests involving only $3CaO.P_2O_5$ and $C_4AF$, the point inclusions were taken to be $3CaO.P_2O_5$. Whether or not this conclusion is correct, there apparently *was* "independent" crystallization of *some* phosphate phase during cooling.

From the practical point of view, the differences between observed and calculated free lime values that are shown in Table 2 are probably extreme, for it seems unlikely that such rapid cooling would be encountered in plant practice. It is also a source of some satisfaction that the calculated values are the higher ones, for this means that the calculations are on the safe side.

The discrepancies do not argue against the validity of Nurse's equations as applied to more slowly cooled clinkers. However, it is worth noting that Nurse was dubious regarding the strict applicability of his equations to clinkers of such low $Al_2O_3/Fe_2O_3$ ratio as to contain no $C_3A$. Since the clinkers of Table 2 do not contain $C_3A$, Nurse himself would apparently have anticipated some discrepancies even had quick cooling not been practiced.

Note: Part II will appear in a forthcoming issue of PIT AND QUARRY.—*Editor*

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## New Adana Cement Plant Increases Turkey's Output To 1,530,000 Tons Annually

With the recent opening of the new cement plant at Adana, Turkey's cement production capacity was increased to 1,530,000 metric tons per year from eight plants, representing 15 units. Eleven of these units have started operation since 1950.

Equipped by the German firm of Klockner-Humboldt-Deutsch A.-G. to produce 150,000 tons of portland cement per year, the new facility cost $7,330,000. Power is provided by a 66,000 v. transmission line.

Completion of other plants now under construction will raise output to about 2,680,000 tons, allowing Turkey to meet its steadily rising cement requirements completely from domestic production.

### Seventh Drilling Symposium To Be Held October 3-5

The Seventh Annual Drilling Symposium will be held on October 3 to 5 by the University of Minnesota's School of Mines and Metallurgy, the Center for Continuation Study, and the Mineral Sub-Section of the Minnesota Section, A.I.M.E.

The symposium will be held at the Center for Continuation Study on the Minneapolis campus of the University.

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Cement production in France last year totaled a record 11,190,000 tons, 6 percent more than in 1955 and 214 percent above the normal pre-war year of 1938. Domestic consumption also increased, and only 630,000 tons were exported.

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The Pennsylvania Glass Sand Corporation, Lewistown, Pa., reported first-half net of $1,280,799 or $1.61 a share compared with $1,242,978 or $1.57 a share a year ago.

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Cementos Caribe, S. A., Barranquilla, Colombia, will increase its daily output to 1,000 tons by the end of the year. Last reported production was 600 tons per day.

## B. C. Cement expansion and new Lafarge plant to effect

# Doubling of Cement Output In British Columbia This Year

By HARRY F. UTLEY

British Columbia, westernmost of the Canadian Provinces, will have sufficient cement-producing capacity by the end of 1957 to take care of its construction needs without the necessity of importing that commodity from mills in the United States.

Waterfront view of the British Columbia Cement Company's plant at Bamberton, B. C., before the last two kilns had been added.

At the start of the year the only producing plant, British Columbia Cement Company, Ltd., at Bamberton, on Vancouver Island, had an annual capacity of 2,300,000 Canadian bbl. Expansion at the Bamberton mill and completion of construction of a new plant on Lulu Island near Vancouver by Lafarge Cement of North America, Ltd., will virtually double capacity within the borders of the province.

The addition of another kiln at Bamberton, which went on the line in July, brings capacity at the British Columbia plant to an estimated 3,200,000 bbl., while the new Lafarge plant, which has a target date of December 15 for the start of production, will have an initial annual capacity of 1,250,000 bbl.

**British Columbia Cement**

Capacity increase of close to 1,000,000 bbl. annually at the British Columbia Cement Company's plant at Bamberton was attained this summer through the addition of another 350-ft. kiln. Raw grinding capacity is ample to care for the increase in output; however, a 13- by 16-ft. Traylor single-stage finish ball-mill was

installed several month ago in anticipation of the increased clinker capacity.

This clinker-grinding unit, said to be one of the largest of its type ever used in cement manufacture, is driven by a 1,500-hp. motor and operates in closed circuit with a 16-ft. Sturtevant air separator. Ball charge is 100 tons with a maximum ball diameter of 3 in.

Raw grinding is also a closed-circuit operation at the Bamberton plant. Ball and tube-mills in series operate on the raw side in this wet-process plant; and the company recently installed latex-lined liquid cyclones of its own design on the tube-mill discharge to effect particle-size separation; the oversize (underflow) product of the cones returns directly to the tube-mills.

Earlier, an arrangement of screens was tried in the circuit, but the management reports the cyclones are doing a more effective job. Conclusive operating data was unavailable when the plant was visited early in the summer of 1957 since the installation was relatively new.

The Bamberton plant was built in 1913 and it has been enlarged and modernized almost continuously during the last 10 years. It is located on a cliff-side on Saanich Inlet, a few miles north of the capital city of Victoria. In 1952 capacity was increased to more than 2,000,000 bbl. when a 10- by 11½- by 350-ft. kiln was installed to supplement the three old 185-ft. kilns. Other improvements made about that time involved a new crushing plant, a modern clinker-storage and clinker-grinding system, and enlarged slurry-blending and storage facilities.

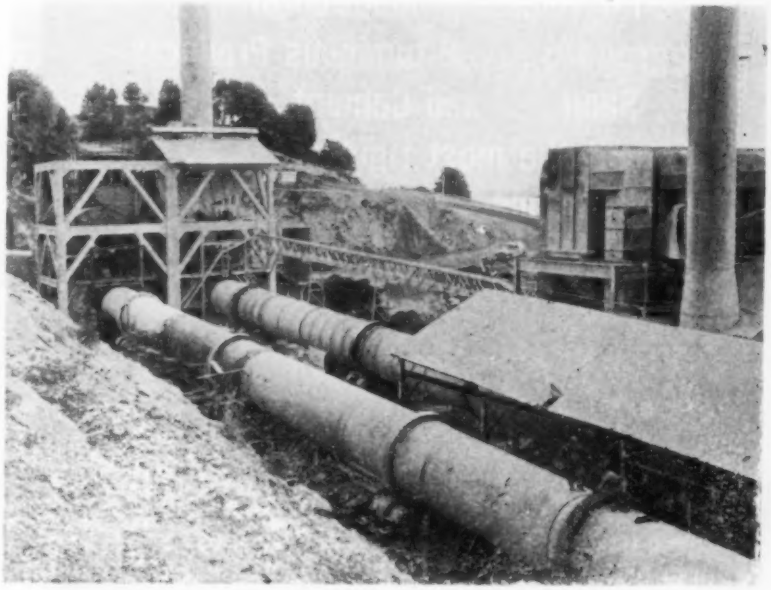
The latest addition to the kiln row is a rotary kiln identical to the one installed in 1952. Both these kilns were built in England by Vickers-Armstrong and shipped directly by water to Bamberton. All 5 kilns have a common firing floor; and pulverized coal, mined on the island, is used as fuel.

The original quarry behind the plant still supplies about 40 percent of the limestone requirements, but it is a low-lime rock for the most part. Since 1925 the company had been receiving its high-calcium stone (97 percent $CaCO_3$) from quarries at Blubber Bay on Texada Island. Tugboats pull the scows 90 miles from Blubber Bay to Bamberton.

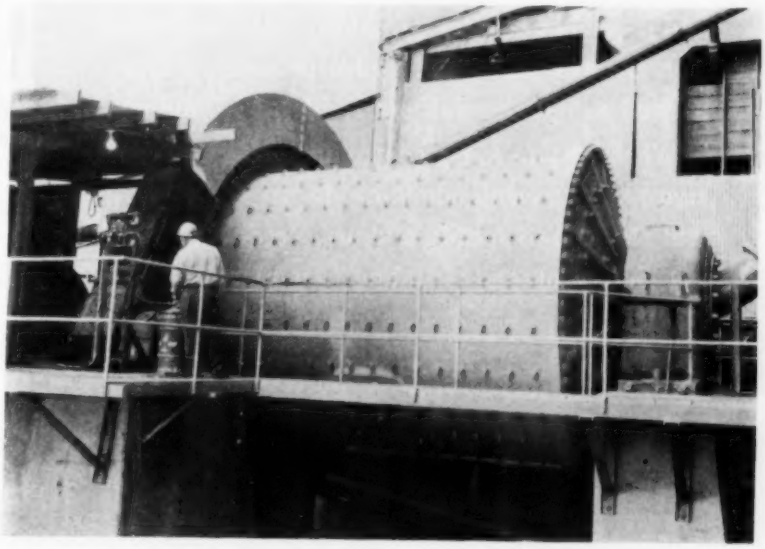
Earlier this year the long water haul was eliminated after an excellent stone deposit was discovered and opened at Cobblehill, only 9 miles from the plant. A private roadway was constructed from the new Cobblehill quarry to the plant, permitting trucks to travel nonstop and with dispatch to deliver the high-grade limestone to the crushing department at the plant.

All improvements and enlargements have been carried out directly by company personnel. N. A. Tomlin is president and general manager of British Columbia Cement Co. R. E. Haskins is works manager.

**Lafarge Cement** The Lafarge Company was formed under the sponsorship of Société Anonyme des Chaux et Cements de Lafarge et du Teil, of Paris, France. Lafarge France, as the parent company is more popularly known, is one of the world's oldest and largest cement producers. It operates 27 plants in France, England, and northern Africa, with a total capacity of 30,000,000 bbl. The concern be-



Installation of new 350-ft. kiln at Bamberton plant was nearing completion when this photograph was taken in June, 1957. It parallels a kiln of similar dimensions which was placed in service about 5 years ago.



Another recent addition to the Bamberton plant is this 13- by 16-ft. clinker mill. It is one of the largest single-stage grinding mills in the cement industry.

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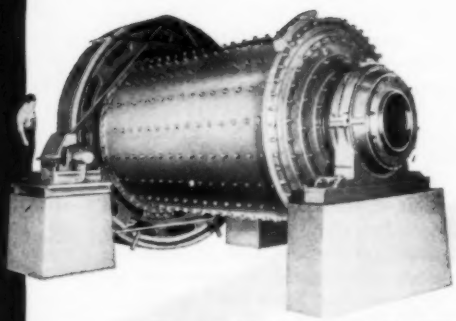
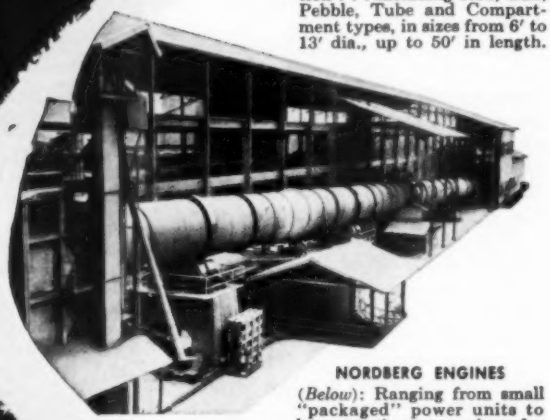
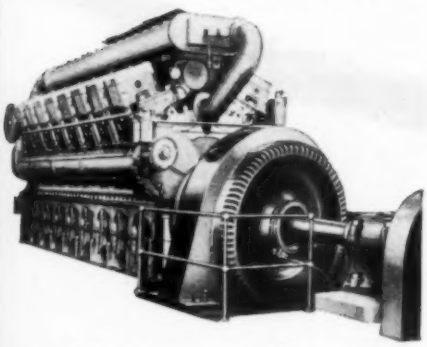
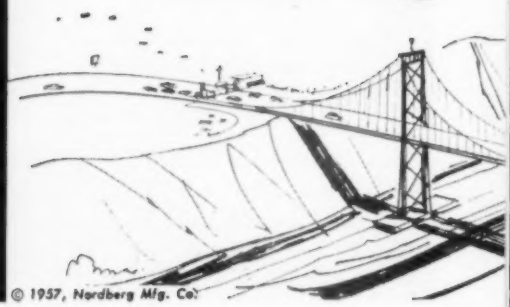


**NORDBERG GRINDING MILLS** (*Above*): Built for wet or dry, open or closed circuit operation . . . including Rod, Ball, Pebble, Tube and Compartment types, in sizes from 6′ to 13′ dia., up to 50′ in length.

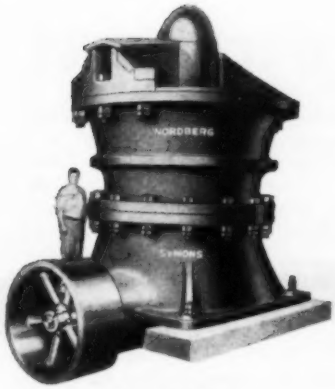


**NORDBERG ENGINES** (*Below*): Ranging from small "packaged" power units to large stationary engines for base load and standby power, Nordberg engines are built in a wide range of types for Diesel, Duafuel® and Spark-Ignition Gas operation, in sizes to over 12,000 hp.



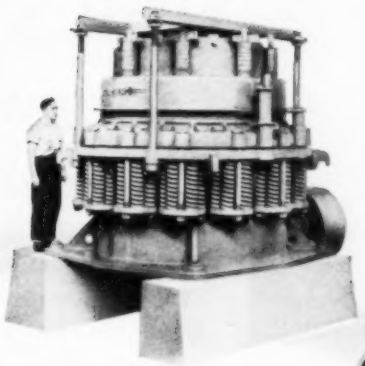


© 1957, Nordberg Mfg. Co.



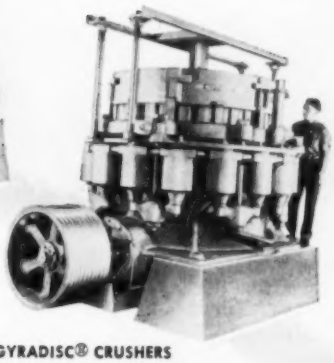
**SYMONS® PRIMARY GYRATORY CRUSHERS**

(*Above*): These gyratory crushers are built for big tonnage, heavy duty primary breaking in 30″, 42″, 48″, 54″, 60″ and 72″ feed opening sizes, for capacities up to 3500 or more tons per hour.



**SYMONS CONE CRUSHERS**

(*Above*): For secondary and finer reductions, Symons Cone Crushers, in both Standard and Short Head types, are built in sizes ranging from 22″ to 7′ in diameter, for capacities from 6 to 900 or more tons per hour.



**GYRADISC® CRUSHERS**

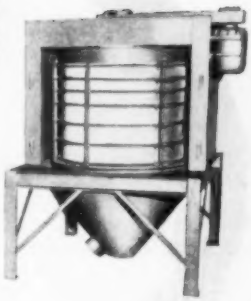
(*Above*): Built to supplement the world renowned Symons Cone Crusher, the Gyradisc Crusher provides a medium for the profitable production of sand sizes of specification material.

**NORDBERG KILNS — DRYERS and COOLERS**

(*Left*): Built to meet a wide range of requirements, including pyro processing operations, drying, calcining, burning and cooling.

**SYMONS V-SCREENS®**

(*Right*): Thoroughly proved in use for extremely fine, single cut wet or dry separations. Employs controlled diffused feed and vertical flow of material.



**SYMONS VIBRATING BAR GRIZZLIES**

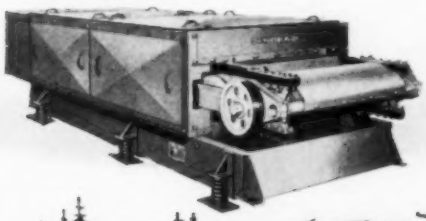
(*Below*): Built for heavy duty large capacity primary scalping service. Particularly effective when handling wet, sticky or gummy rock.

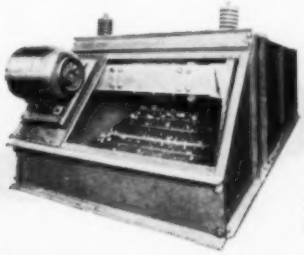
**SYMONS HORIZONTAL VIBRATING SCREENS**

(*Below*): Permit level, large capacity screening of extreme accuracy. Built in single, double and triple deck types in a wide range of widths and lengths. Available with dust housing (as illustrated) for handling multi-aggregate bituminous mix in asphalt work.

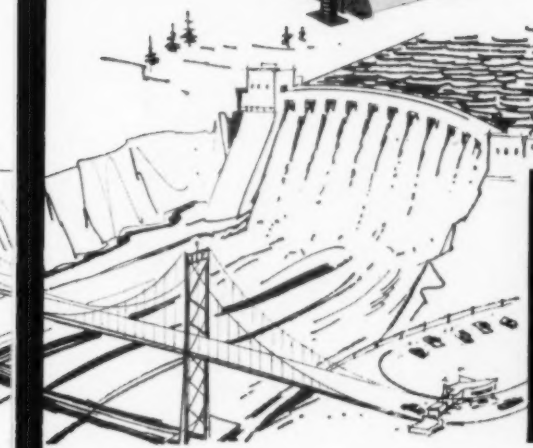
**SYMONS ROD DECK SCREENS**

(*Below*): Highly efficient screening surface of spring steel rods—easily replaced. Especially suited for wet, sticky materials.





*SYMONS . . . A Registered Nordberg Trademark Known Throughout The World.*



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NORDBERG MACHINERY

# NORDBERG

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A construction view of the new Lafarge plant on Lulu Island shows the clay-storage tank formwork.

gan producing lime and mortar at a limestone deposit at Le Tiel on the Rhone River in 1830, and has been in the cement business since the early years of the present century.

Lafarge Cement of North America, Ltd., the new British Columbia subsidiary, is headed by the Hon. Frank MacKenzie Ross, present governor of British Columbia. The new Lulu Island plant, 10 miles southeast of downtown Vancouver, is situated on the Fraser River waterfront and will receive its raw materials by barge. In the formation of the company it also acquired the holdings of Beale Quarries, Ltd., on Texada Island, 80 nautical miles away. These are being expanded, improved, and newly-equipped to supply stone for the Lulu Island plant.

New equipment being installed at the Texada Island quarry includes a Joy Champion rotary drill, a 3-cu. yd. Bucyrus-Erie diesel shovel, two 24-ton capacity Euclid end-dump trucks, two Allis Chalmers jaw-crushers, and a Pennsylvania Impactor mill. After reduction to minus ½ in., the stone will be stockpiled and tunnel-reclaimed by conveyor and delivered into the self-cleaning hoppers of a 3,000-ton-capacity self-unloading barge.

Loading into the 14-compartment hold (two rows of 7 hoppers) will be at an estimated rate of 1,000 t.p.h. Upon arriving at the Lulu Island wharf, belt conveyors beneath each row of hoppers will deliver to a cross belt which will transfer to a shore-side belt 600 ft. long to carry the stone to the plant's storage hall.

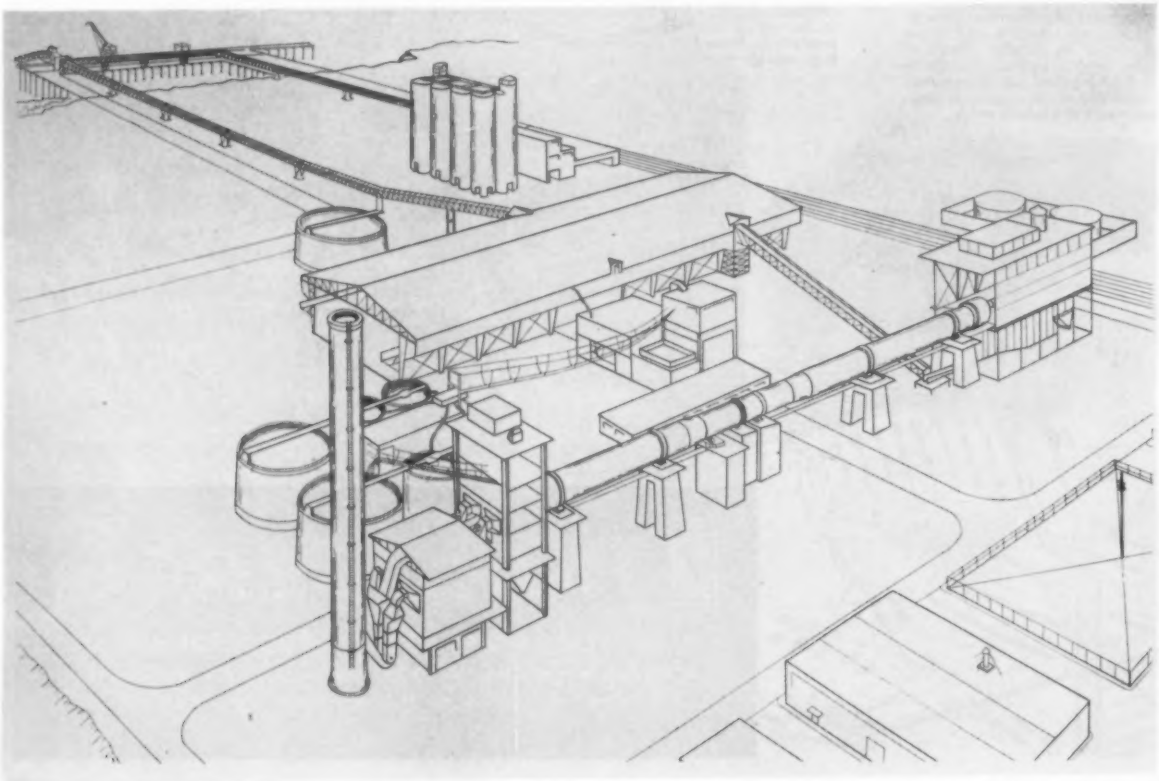
Clay is to be obtained from a deposit 24 miles up-river, at Matsqui. Here a 4-cu. yd. Sauerman slackline cableway will excavate the argillaceous component of the raw feed and deliver it directly to an F. L. Smidth wash-mill. The clay slip, with a 50 to 60-percent moisture content, is to be pumped through a 12-in. by 1400-ft. pipeline to tanker barges for transportation down the Fraser to the plant.

The storage hall for clinker, limestone, and gypsum at the plant is 100 by 300 ft. in ground area and is served by an Appelevage overhead clamshell crane.

The Lafarge mill building initially will house two Unidan mills, one on the raw side and one for finish grinding, each driven by a 1400-hp. motor through a Symetro drive.

(*Continued on page* 112)

Sketch of the new facility of Lafarge Cement of North America, Ltd., on Lulu Island, near Vancouver, B. C., showing its riverfront receiving facilities in the background.



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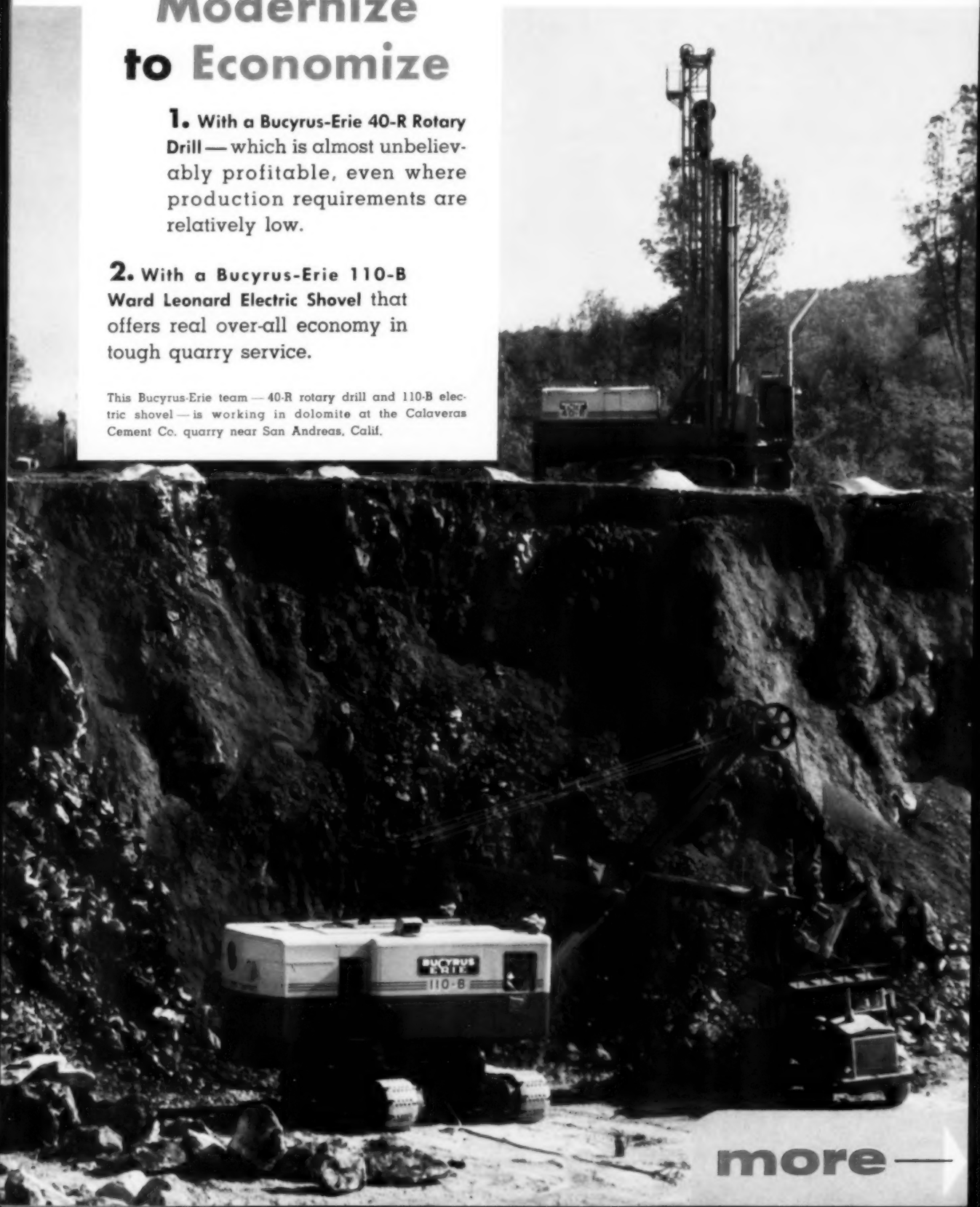
**1. With a Bucyrus-Erie 40-R Rotary Drill** — which is almost unbelievably profitable, even where production requirements are relatively low.

**2. With a Bucyrus-Erie 110-B Ward Leonard Electric Shovel** that offers real over-all economy in tough quarry service.

This Bucyrus-Erie team — 40-R rotary drill and 110-B electric shovel — is working in dolomite at the Calaveras Cement Co. quarry near San Andreas, Calif.




more —

# ...More about 2 proved ways you can Modernize to Economize

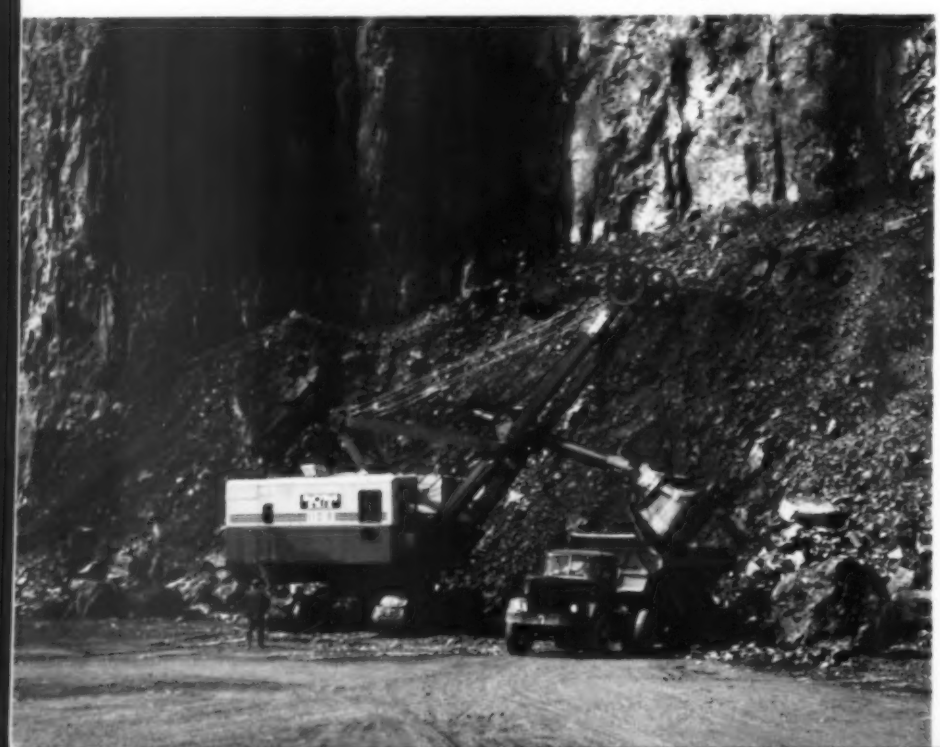
The 40-R Rotary DOES Cut Drilling Costs — in quarry after quarry, with features like these: air bailing cools the bit and cleans out cuttings. Remote-controlled, power-driven drill pipe rack reduces manual effort. Hydraulically powered down pressure on the bit provides controlled load on drilling tools for maximum penetration. Ward Leonard control on rotation of the drill pipe permits drilling at the most efficient speed for a given formation. No wonder those who use them want to convert completely to Bucyrus-Erie rotaries!

**Let Us Estimate the Savings to You** — Trained Bucyrus-Erie men will study your operations and show you how you can use the 40-R to effect real cost savings — *even with relatively low production requirements.* You have nothing to lose — and much to gain — by letting us *prove* what the 40-R will save you.

The 110-B Ward Leonard Electric Shovel has been known as a low-cost performer wherever it is used — particularly on jobs involving big yardages, or extra tough materials or conditions. It is not a "stretched" machine. It was designed from the ground up to handle 4½ yards in tough going. The outstanding performance of the one shown here loading trap rock in New Jersey made the owner a repeat buyer.

**Give Us an Opportunity to Explain Its Savings.** We would like to show you production and cost figures which tell best how the 110-B performs and how it saves money.

A Bucyrus-Erie 110-B 4½-yd. electric shovel loads trap rock.



This Bucyrus-Erie 40-R rotary drills 9-in. hole in dolomite.

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# Final Report on Mineral Output Of Six Southeastern States in 1955

**Tennessee** The value of mineral production in Tennessee in 1955 was $119,325,000 compared with $105,683,000 in 1954,according to the U. S. Bureau of Mines. This represents an increase of 13 percent over 1954 and established a new annual record. Cement manufacturing continued to expand, increasing 7 percent in total value for a new annual record, and the stone industry maintained its high rate of production.

*Nonmetals*—Marketable production of phosphate rock decreased 10 percent below the 1954 record. Production of crushed and dimension stone continued to increase, and had a total value in excess of any previous year, while sand and gravel production was reported to be about the same as in 1954.

**Kentucky** The value of mineral production in Kentucky in 1955 was $390,428,000, compared with $327,503,000 in 1954. This represents an increase of 19 percent over 1954, due mainly to increased coal production. The total value was 23 percent below 1948, the record year. New alltime highs were recorded in the ball clay, sand and gravel, stone, and oil and gas industries.

*Nonmetals*—Shipments of portland cement were about the same as in 1954. Production of fluorspar continued to decline to the lowest level since 1910. Sand and gravel production established a new alltime high, exceeding 1954 by 4 percent. Production of stone exceeded that of any previous year, increasing 18 percent over 1954.

**South Carolina** Mineral production in South Carolina during 1955 was $20,197,000, an increase, of 14 percent above that of 1954 ($17,744,000).

*Nonmetals*—In terms of value, cement, clay, stone, sand and gravel, and vermiculite, in the order named, were the state's most important mineral commodities. Except for miscellaneous clay, all minerals showed gains in both tonnage and value over 1954.

Sand and gravel gained 11 percent in tonnage but only 5 percent in

**Mineral Production in Tennessee, 1954-55[1]**

| Mineral | 1954 Short Tons (unless otherwise stated) | 1954 Value | 1955 Short Tons (unless otherwise stated) | 1955 Value |
|---|---|---|---|---|
| Cement, portland, 376-lb. bbl. | 7,569,279 | $19,734,262 | 8,016,859 | $21,175,825 |
| Cement, masonry, 376-lb. bbl. | [2] | [2] | 794,994 | 2,497,287 |
| Clays | 1,015,256 | 3,780,952 | 1,207,613 | 4,169,885 |
| Coal | 6,428,831 | 25,477,006 | 7,052,844 | 28,746,574 |
| Copper | 9,087 | 5,361,861 | 9,911 | 7,393,569 |
| Gold, troy ounces | 218 | 7,630 | 221 | 7,735 |
| Lime | 80,372 | [2] | [2] | [2] |
| Manganese ore (metallurgical) | 11,823 | 919,949 | 15,895 | 1,280,102 |
| Natural gas, million cu. ft. | 89 | [2] | 39 | [2] |
| Petroleum (crude) thousand 42-gal. bbl. | [2] | [2] | 17 | [2] |
| Phosphate rock, long tons | 1,633,226 | 11,743,012 | 1,465,902 | 10,526,404 |
| Sand and gravel | 5,155,185 | 6,141,139 | 5,136,543 | 5,814,116 |
| Silver, troy ounces | 60,759 | 54,990 | 66,619 | 60,294 |
| Stone | 14,040,187 | 22,046,016 | [4]14,471,388 | [4]22,611,969 |
| Zinc | 30,326 | 6,550,345 | 40,216 | 9,893,087 |
| Undistributed: Barite, iron ore, pyrite, stone (granite) and minerals whose values must be concealed for particular years (indicated by footnote reference[3] | | 6,455,468 | | 7,774,144 |
| Total Tennessee | | [5]105,683,000 | | [5]119,325,000 |

[1]Production as measured by marketable production, mine shipments, or mine sales (including consumption by producers).
[2]Not canvassed separately.
[3]Figure withheld to avoid disclosure of individual company operations. Value included with undistributed.
[4]Incomplete figure, excludes granite, value for which is included with "Undistributed."
[5]The total has been adjusted to eliminate duplications n the value of materials used in cement and lime.

**Mineral Production in Kentucky, 1954-55[1]**

| Mineral | 1954 Short Tons (unless otherwise stated) | 1954 Value | 1955 Short Tons (unless otherwise stated) | 1955 Value |
|---|---|---|---|---|
| Clays | 571,481 | $2,994,926 | 875,699 | $4,416,131 |
| Coal | 56,964,408 | 236,736,940 | [3]69,019,910 | [3]288,665,344 |
| Fluorspar | 35,831 | 1,510,344 | 8,899 | 308,140 |
| Lead (recoverable content of ores) | 80 | 21,920 | | |
| Natural gas, million cu. ft. | 72,713 | 16,579,000 | 73,214 | 17,352,000 |
| Natural gas liquids, Natural gasoline, thousand gal. | 28,224 | 1,552,000 | 34,991 | 2,492,000 |
| LP gases, thousand gal. | 189,966 | 5,066,000 | 189,247 | 6,451,000 |
| Petroleum, thousand 42-gal. bbls. | 13,791 | 40,270,000 | 15,297 | 44,210,000 |
| Sand and gravel | 4,729,606 | 4,401,793 | 4,898,705 | 5,298,102 |
| Stone | 10,129,725 | 13,285,786 | 11,933,899 | 15,579,312 |
| Zinc (recoverable content of ores) | 458 | 98,928 | | |
| Undistributed: Asphalt (native) and cement (Portland 1954-55, and masonry 1955) | | 5,625,951 | | 6,445,724 |
| Total Kentucky | | [2]327,503,000 | | [2]390,428,000 |

[1]Production as measured by marketable production, mine shipments, or sales (including consumption by producers).
[2]Preliminary figure.
[3]The total has been adjusted to eliminate duplications in the values of clays and stone.

value over 1954. Cement production was up 13 percent, barite 13 percent, kyanite 77 percent, and vermiculite 9 percent in total value. Sheet mica more than doubled in quantity but its value was only 46 percent higher. Scrap mica recovered from mica schist was 24 percent above 1954.

**Georgia** The mineral industry of Georgia continued to expand in 1955, and production for the year was valued at $60,417,000, an increase of 8 percent above the $55,828,000 recorded in 1954, according to the Bureau of Mines. Clays, stone, cement, sand and gravel, barite, iron ore and slate, in that order, were the principal mineral products in 1955.

*Nonmetals*—Nonmetallic minerals constituted almost 98 percent of the year's production value, with metals, coal, and peat making up the remainder. Most of the nonmetallic minerals showed gains in both tonnage and value over 1954. Exceptions were: cement, down slightly in tonnage but with total value remaining about the same as in 1954; sheet mica, down 47 percent but 21 percent higher in value; slate, with an increase in tonnage but valued slightly lower than the preceding year; and sand and gravel, up 11 percent in tonnage but 11 percent lower in value than in 1954. Clays, making up 43 percent of the value of mineral production, increased 9 percent in tonnage and 8 percent in value; and stone, representing 38 percent, increased 15 percent in tonnage and 9 percent in value.

Due to increased demands for well drilling materials and chemical use, barite production increased about 70 percent in tonnage and value over 1954.

The number of sheet mica miners dropped to 16 in 1955 from 29 reported in 1954, and the quantity of sheet mica produced declined 47 perecnt, its value, was however, was 21 percent higher. Scrap mica increased 26 percent in tonnage and 71 percent in value.

Total stone production, including granite limestone, sandstone, and quartzite, continuing its upward trend, was 15 percent greater in tonnage and 9 percent higher in value than in 1954.

Four projects under the Defense Minerals Exploration Administration (DMEA) program to aid in the exploration and development of strategic minerals were active in 1955 compared with eight projects in 1954. Three contracts were for mica in Cherokee, Union, and Upson counties and one for beryl in Troup County.

**Mineral Production in South Carolina, 1954-55[1]**

| Mineral | 1954 Short tons (unless otherwise stated) | 1954 Value | 1955 Short tons (unless otherwise stated) | 1955 Value |
|---|---|---|---|---|
| Clays | 1,136,019 | $4,702,027 | 1,086,492 | $5,463,179 |
| Sand and gravel | 2,813,750 | 2,550,260 | 3,126,952 | 2,677,054 |
| Stone | [2]2,861,953 | [2]4,233,270 | 3,455,388 | 4,920,697 |
| Undistributed: Barite, cement, kyanite, dimension granite (1954), mica, and vermiculite | | 6,373,880 | | 7,399,847 |
| Total South Carolina | | [3]17,744,000 | | [3]20,197,000 |

[1]Production as measured by mine or plant shipments, sales, or marketable production (including consumption by producers).
[2]Excludes dimension granite.
[3]The total has been adjusted to eliminate duplication in the value of clay used for cement.

**Mineral Production in Georgia, 1954-55[1]**

| Mineral | 1954 Short Tons (unless otherwise stated) | 1954 Value | 1955 Short Tons (unless otherwise stated) | 1955 Value |
|---|---|---|---|---|
| Cement (portland)-376 lb. bbl. | [2] | [2] | [2] | [2] |
| Clays | 2,711,422 | $24,106,926 | 2,953,278 | $26,144,672 |
| Coal | 8,090 | 40,450 | [5]12,471 | [5]62,360 |
| Iron ore (usable) long tons | 221,576 | 871,901 | 256,700 | 994,289 |
| Iron oxide pigments (crude) | [2] | [2] | 6,139 | 35,607 |
| Mica | [4] | 254,093 | [4] | 353,322 |
| Peat | 5,150 | 60,920 | [2] | [2] |
| Sand and gravel | 2,703,281 | 2,466,352 | 2,987,570 | 2,198,905 |
| Stone | 8,057,600 | 21,384,227 | 9,240,202 | 23,248,489 |
| Talc and soapstone (crude) | 50,536 | 176,876 | 53,828 | 117,656 |
| Undistributed: Asbestos (1954), barite, bauxite, beryllium concentrates, masonry cement (1955), feldspar, gem stones (1955), lime (1954), manganese and manganiferous ores, slate and minerals whose value must be concealed for a particular year (indicated by footnote reference [2]) | | [2]7,227,339 | | 8,143,439 |
| Total Georgia | | [5,6] 55,828,000 | | [6] 60,417,000 |

[1]Production as measured by mine shipments, mine sales, or marketable production (including consumption by producers).
[2]Included with "Undistributed."
[3]Preliminary figure.
[4]Figure withheld to avoid disclosure of individual company operations.
[5]Revised figure.
[6]The total has been adjusted to eliminate duplication in the value of clays and stone.

**Florida** In 1955 the total value of mineral production in Florida was $106,371,000, compared with $106,510,000 in the previous year. Despite substantial gains in production for all other minerals and the inclusion of oyster shell for the first time as mineral production, the total value failed to exceed that of 1954, due to the 17 percent loss ($10,860,000) suffered by phosphate rock as a result of a general labor strike for several weeks' duration. Increases in value of production were reported for cement (5 percent), clays (44 percent), stone (27 percent), sand and gravel (63 percent), titanium minerals—ilmenite (53 percent) and rutile (29 percent), zircon (74 percent), abrasive garnet (111 percent), lime (11 percent), and peat (38 percent).

*Nonmetals*—Cement again established a new all-time high with the quantity shipped 2 percent greater and value 5 percent higher than in 1954. Abrasive garnet and staurolite were produced as by-products in the concentration of titanium minerals. Lime production was 10 percent above 1954. Commercial crushed limestone production was again at an all-time high, increasing 15 percent in tonnage and 27 percent in value. Phosphate rock production, as a result of a shut-down of operations for several weeks due to a general strike, was 16 percent below the

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peak of 1954. Sand and gravel production was greater than in any year since 1951, reaching an all-time high in 1955.

**Alabama** The value of mineral production in Alabama in 1955 was $181,409,000, compared with $151,330,000 in 1954 according to the U. S. Bureau of Mines. This represents an increase of 20 percent over 1954, due mainly to recovery of the coal mining industry, and to increased production of cement and iron ore. Total value was 3 percent below 1953, the record year. New all-time highs were recorded in the cement, salt, and stone industries.

*Nonmetals*—Portland cement shipments increased 6 percent over 1954 and established a new record. Lime production increased 10 percent. Production of mica was considerably less than in 1954. Salt production increased 2 percent for a new annual record while production of sand and gravel decreased 7 percent below 1954, the record year.

Mineral Production in Florida, 1954-55 [1]

| Mineral | 1954 Short Tons (unless otherwise stated) | 1954 Value | 1955 Short Tons (unless otherwise stated) | 1955 Value |
|---|---|---|---|---|
| Clays (including fuller's earth) | 371,948 | $3,337,130 | 412,766 | $4,815,855 |
| Natural gas million cu. ft. | 35 | 3,000 | 36 | 4,000 |
| Peat | 37,449 | 168,004 | 61,098 | 231,829 |
| Petroleum thousand 42-gal. bbl. | 548 | [2] | 495 | [2] |
| Phosphate rock long tons | 10,437,197 | 64,499,877 | 8,747,282 | 53,640,301 |
| Sand and gravel | 3,468,842 | 2,661,152 | 5,065,503 | 4,349,148 |
| Stone (exclusive of dimension limestone) | 14,225,356 | 16,832,066 | 17,027,967 | 22,966,008 |
| Titanium concentrates: Ilmenite gross weight | 157,157 | 2,411,823 | [2] | [2] |
| Rutile gross weight | 7,305 | 869,677 | 9,182 | 1,122,000 |
| Zirconium concentrate | 17,959 | 820,041 | 28,913 | 1,425,641 |
| Undistributed: Cement, abrasive garnet, lime, monazite, stone (dimension limestone), and minerals which must be concealed, as indicated by footnote [2] | | 15,955,786 | | 22,787,050 |
| Total Florida | | [3]106,510,000 | | [3]108,957,000 |

[1]Production as measured by mine or plant shipments (including consumption by producers), except that fuels are strictly production.
[2]Figure withheld to avoid disclosure of individual company operations. Included in "Undistributed."
[3]The total has been adjusted to eliminate duplication in the value of clays and stone.

Mineral Production in Alabama, 1954-55 [1]

| | 1954 Short Tons (unless otherwise stated) | 1954 Value | 1955 Short Tons (unless otherwise stated) | 1955 Value |
|---|---|---|---|---|
| Cement (portland)-376-lb. bbl. | 11,121,599 | $28,582,683 | 11,782,095 | $31,517,373 |
| Cement (masonry)-376-lb. bbl. | [2] | [2] | 1,938,520 | 6,832,671 |
| Clays | 1,330,900 | 2,258,211 | [3] | [3] |
| Coal | 10,282,506 | 64,029,502 | [4]13,088,477 | [4]74,363,206 |
| Iron ore (usable), long tons | 5,913,462 | 33,327,083 | 6,813,670 | 44,657,215 |
| Lime | 121,807 | 4,488,167 | 462,194 | 5,185,700 |
| Mica | [3] | 14,956 | [3] | 9,582 |
| Natural gas (marketed production) million cu. ft. | 87 | 5,000 | 282 | 20,000 |
| Petroleum (crude) thousand 42-gal. bbl. | 1,584 | 3,690,000 | 1,377 | 2,840,000 |
| Sand and gravel | 3,966,345 | 3,450,858 | 3,680,173 | 3,523,524 |
| Stone | 7,393,530 | 11,608,937 | 8,269,355 | 11,867,191 |
| Talc | | | 1,500 | 8,000 |
| Undistributed: Asphalt (native) bauxite, puzzolan cement, salt, and minerals whose values must be concealed for particular years (indicated in appropriate column by footnote reference [3]) | | 4,840,589 | | 4,315,625 |
| Total Alabama | | [5]151,330,000 | | [5]181,409,000 |

[1]Production as measured by marketable production, mine shipments, or sales (including consumption by producers), except that bauxite is strictly production.
[2]Not reported separately in 1954.
[3]Figure withheld to avoid disclosure of individual company operations. Value included with "Undistributed."
[4]Preliminary figure.
[5]The total has been adjusted to eliminate duplications in the value of clays and stone.

## Cement Expansion in B.C.

(*From page* 106.)

Jeffrey-Waytrol feeders will proportion mill feed.

The 11- by 13- by 425-ft. rotary kiln is being fabricated in France by F. L. Smidth & Co. Through a multiple-burner arrangement, fueling with either natural gas, oil, or pulverized coal will be possible. Dust will be collected electrically by a V.I.M. precipitator built by Asea (Sweden) and discharged through a concrete stack. A Fuller No. 750 inclined grate cooler will handle the clinker as discharged. Six 1000-ton silos will be used to store finished cement. The entire plant is being laid out so that future enlargement may be undertaken without interrupting production.

D. Francois and P. Ducroiset of Lafarge France are the project engineers in charge of construction.

## Charles H. Topping Elected B.R.I. President for 1957-58

Charles H. Topping, senior architectural and civil consultant for E. I. du Pont de Nemours and Company, Wilmington, Del., has been elected president for the 1957-58 year of the Building Research Institute, technical society for the building industry. He succeeds Edmund Claxton, director of research for the Armstrong Cork Company of Lancaster, Pa., who has just completed two terms as B.R.I. president.

Harold L. Humes, vice-president of the Baldwin-Hill Company, Trenton, N. J., manufacturer of home and industrial insulation, was chosen vice-president.

JOHN CARROL MCCOE has been appointed technical director of the Green Bag Cement Division, Pittsburgh Coke & Chemical Company, Pittsburgh, Pa. As technical director, Mr. McCoe will be concerned with technical service, research, and quality control, Neville Island plant.

Judge FRANK S. DELAND of West Roxbury Municipal Court, Boston, Mass., has been elected chairman of the Boston Sand and Gravel Company's board of directors.

***One cement plant effects a considerable saving on repair work by using a trunnioned fixture into which manganese steel parts are clamped for treatment with a semi-automatic welder. Alloy flux permits the use of mild steel electrode wire.***

# welding time cut two-thirds

**By ALBERT T. BAVARIA**
District Engineer
The Lincoln Electric Company
Cleveland, Ohio

ANOTHER P&D EXCLUSIVE

NUMEROUS hammermills are employed in a large Eastern cement plant in one stage of crushing lumps of limestone from which cement is manufactured. Each of these Pennsylvania hammermills includes a set of cast manganese steel hammers that are pivoted on shafts passed through a hole near the small end. As many as 44 hammers are used in individual mills.

At the large end, which does the crushing, the hammers are subject to rapid wear. Ends and edges become rounded, as on the hammer appearing at the right in Figure 1. After 24 hours of continuous use, all hammers must be turned over, so that the opposite side strikes the blows. After the second day, all hammers are removed to repair this damage. It was customary to build up the rounded edges and corners by hand arc-welding with alloy electrode. When this had been done, the hammers had their crushing ability restored and were good for another two days of use.

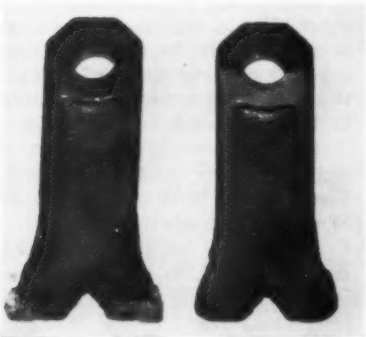

Figure 1—Two cast manganese steel hammers of the type used in Pennsylvania hammermills. In the hammer at the right, lower ends and edges are rounded from wear. Build-up welds of hard alloy steel have been applied to the hammer at the left, which is ready for re-use.

To make repeated build-up by such means on dozens of hammers daily, however, was a tedious, time-consuming and expensive job, because many hours of welding time were needed per set of hammers. The alloy electrode used was also expensive. It was logical, therefore, for the plant management to seek a faster method of making the repairs and to try to lower material costs without sacrifice in hammer performance.

It was decided to try a Lincoln semi-automatic welder, commonly called a "squirt" welder, and to use in this welder the common mild steel wire in combination with No. 550 hardsurfacing flux to submerge the arc. This flux contains the necessary alloying elements to produce build-ups that are as hard, tough, and abrasion-resistant as those produced with the alloy electrodes formerly used. Both the wire and the flux are moderate in cost.

It was found that build-up beads could be applied faster by the "Squirt" gun than with hand electrodes, but with hammers handled individually it was not easy to keep the flux in proper position. Accordingly, the plant management decided to build a fixture in which a whole set of hammers could be clamped and then apply backings that would hold the flux where it was needed. Such a fixture would permit making continuous welds over the whole length of the set of hammers and thus permit the high weld rate attainable with a "squirt" welder.

This fixture, designed and built in the plant's machine shop, took the form shown in Figures 2 to 7 inclusive. In combination with the "squirt" welder and a flame-cutting travel carriage supported on a track, the fixture became, in effect, an almost fully automatic welding machine that handles the required build-up work on full sets of hammers of two different sizes. Figure 2 shows the fixture itself and the carriage track, but not the carriage. In the background is the manual welder and the "squirt" gun that it feeds along with a separate 600 ampere motor generator that supplies high current to the "squirt" gun.

Basically, the fixture is a steel trough in which a set of hammers is placed and clamped with the

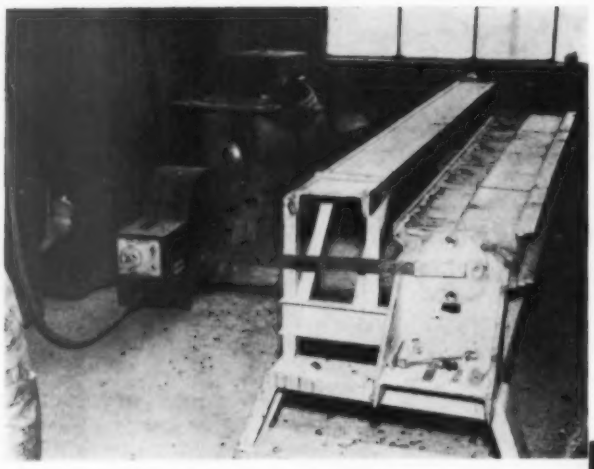

Figure 2—Left: The special trunnioned fixture (right) used in a large Eastern cement mill to hold hammers worn in hammermill operations. Clamped in the fixture, which is on its side, is a set of hammers to which build-up welds are applied by the "squirt" welder (left).

castings face-to-face, the rounded ends protruding upward. At the ends of the trough are the clamping screws and the trunnions, mounted in supports that make it possible to rock the loaded trough through more than 180 degrees. Figure 2 shows the trough rocked onto one side. A channel forms the bottom of the trough, and its sides and ends are steel plates.

Trunnion supports are welded to a castered base, as is also a channel with edge strips that form a track for the travel carriage. This permits the whole fixture to be moved readily. The trough is wider than the hammers, and when they are set in it with hole ends down, the upper portion of each hammer extends above the trough. There is space at each side for adding rails and copper backing strips which are fastened by bolts at each end. Between the rails and backings, wedges are placed, as in Figure 3, to hold the strips close to the hammers. These strips project above the ends of the hammers and hold the flux. They also prevent the metal melted by the arc from running down the open sides of the hammers.

Figure 3 also shows the travel carriage. At one side its crossbar has a rack bar which runs through a support, where the rack meshes with a small pinion turned by a handwheel to traverse the bar parallel to its length. On the inner end of the bar there is a support for a vertical rack bar that is adjustable up and down by a second handwheel. Attached to the lower end of the vertical bar is a bracket having a support for the "squirt" gun and its flux hopper. By turning the handwheels, the gun is adjusted transversely and for height, so that the electrode produces an arc above the hammer ends as the carriage advances the gun parallel to the row of hammers.

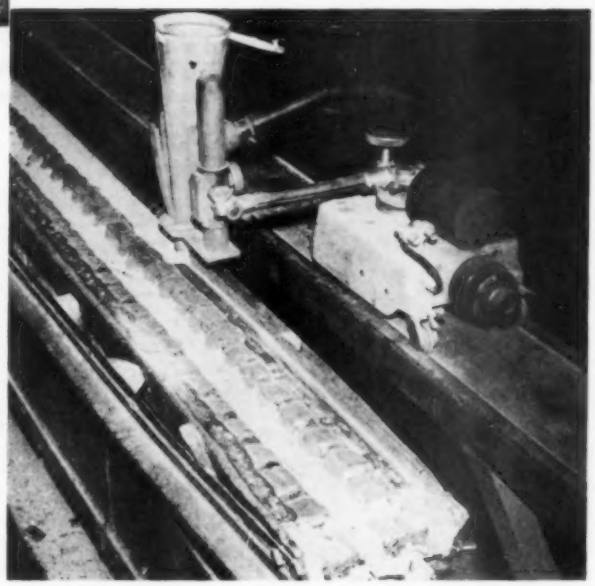

Figure 3—A closeup of the "squirt" welder supported on a rack bar extending from the travel carriage at the right. A weld bead is being laid down along one side of a set of hammers held in the fixture at the left. Copper strips at the edges keep the flux and molten weld metal from flowing off.

After the hammers are clamped in the trough-like fixture with their worn ends at uniform height, there is at the top, where each hammer face is held against the next face, a transverse groove or valley, formed by the worn edges at the top ends of the faces. If these grooves are deep, they are first filled by hand arc welding, as in Figure 4. This is done so that, when the carriage advances the "squirt" gun, its electrode will not have to fill deep valleys, but will produce a reasonably level bead. These transverse welds are short and quickly made in convenient position; hence, the total time for making them is short. Current for hand welding is supplied by the same generator as the one used for the "squirt" welding operation.

When transverse valleys have been filled with hardsurfacing electrode, the "squirt" welder is placed in the travel carriage bracket and is used to lay down a series of longitudinal beads, one of which is shown in process in Figure 5. Beads are run from end-to-end of the row of hammers with 5/64 in. diameter mild steel wire. The wire is fed continuously from the welding gun, from which also flows a hardsurfacing alloy flux. This covers the arc and provides the alloying elements to make a hard, tough deposit.

It usually requires six to eight passes to build up hammer ends, adding the new metal, such as is shown at the ends of the repaired hammer, left in Figure 1. Each weld is made rapidly, as the travel carriage is set to move the gun from 14 to 18 in. a minute, depending upon the size of bead required. As the flux submerges the arc, the operator does not have to wear a mask. He only keeps the gun adjusted vertically and horizontally to deposit the bead where it is wanted.

As the hammers are worn on the short sides as well as on the ends, it is necessary to apply build-up beads along these sides. To facilitate this, a lever, shown in the boss socket at the end of the fixture in Figure 2, is used to swing the fixture 90 degrees to the position shown in Figures 2 and 6. A pin through one of three boss holes holds the fixture in any of three positions. After rocking the fixture, so that a side face is up, and putting a copper backing strip along one edge, as in Figure

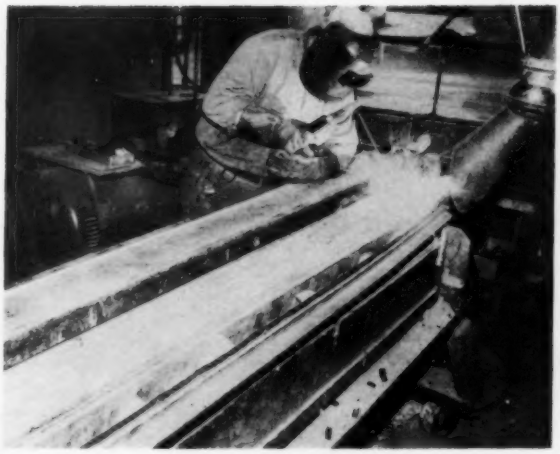

Figure 4—Short, transverse valleys between the worn edges of the hammers, clamped in the trough-like holding fixture, are being partly filled in by short hand welds applied with alloy electrodes before build-up beads are applied longitudinally by a "squirt" welder.

Figure 5—Using a "squirt" welder in an Eastern cement plant to build up worn ends and edges of cast manganese steel hammermill hammers, clamped face-to-face in the fixture shown. Alloy flux insures hard, tough beads.

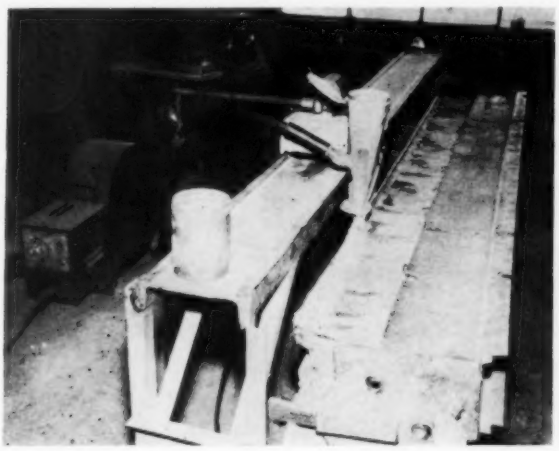

Figure 6—The same setup shown in other illustrations, but with the fixture that holds a set of hammers rocked to a position where the hammer edges are up. The "squirt" welder is applying bead at the edge next to a copper back-up strip, the arc being submerged in No. 550 alloy flux.

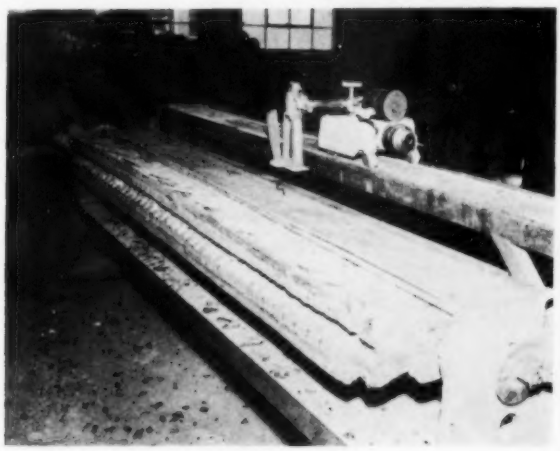

Figure 7—A fixture with a set of hammers in place, but rocked 180 degrees from the position shown in Figure 6. A "squirt" welder has completed the build-up beads and has been removed from the holder on the travel carriage (background).

6, the "squirt" gun is reset, as shown, and lays down one or more side beads. Similar beads are applied on the opposite side of hammers after the fixture is rocked 180 degrees to the position in Figure 7, the gun being adjusted accordingly.

A small can of flux is used as needed to keep the gun hopper supplied. One bag of flux is sufficient for repairs on three sets of hammers, and one coil of electrode wire is enough for two sets of hammers. Occasionally, if hammers are badly worn, some unalloyed flux is used in making a first pass. This yields a soft weld bead, but it is covered later by hard beads for which the alloyed flux is employed.

Welds made as described result, of course, in joining each hammer to those next to it. When welding has been completed, the clamping screws are backed off and the trough is tilted so that the hammers fall out onto the floor in what is then a one-piece weldment. As the weld beads are only along worn corners, however, the hammers are easily separated by driving a cold chisel between the unwelded ends. This breaks the connecting weld beads, leaving the hammers ready for reuse.

Build-up welds, made in the manner described, are produced in about one-third the time formerly required for hand weld build-up on one hammer at a time. As the materials cost no more, there is a substantial overall saving. The life of the hammers is at least equal to that attained with the old build-up method, and wear per day is no greater than before.

As the total investment for the "squirt" welder, travel carriage, and fixture was small and large savings have resulted, the management is well pleased with the results attained.

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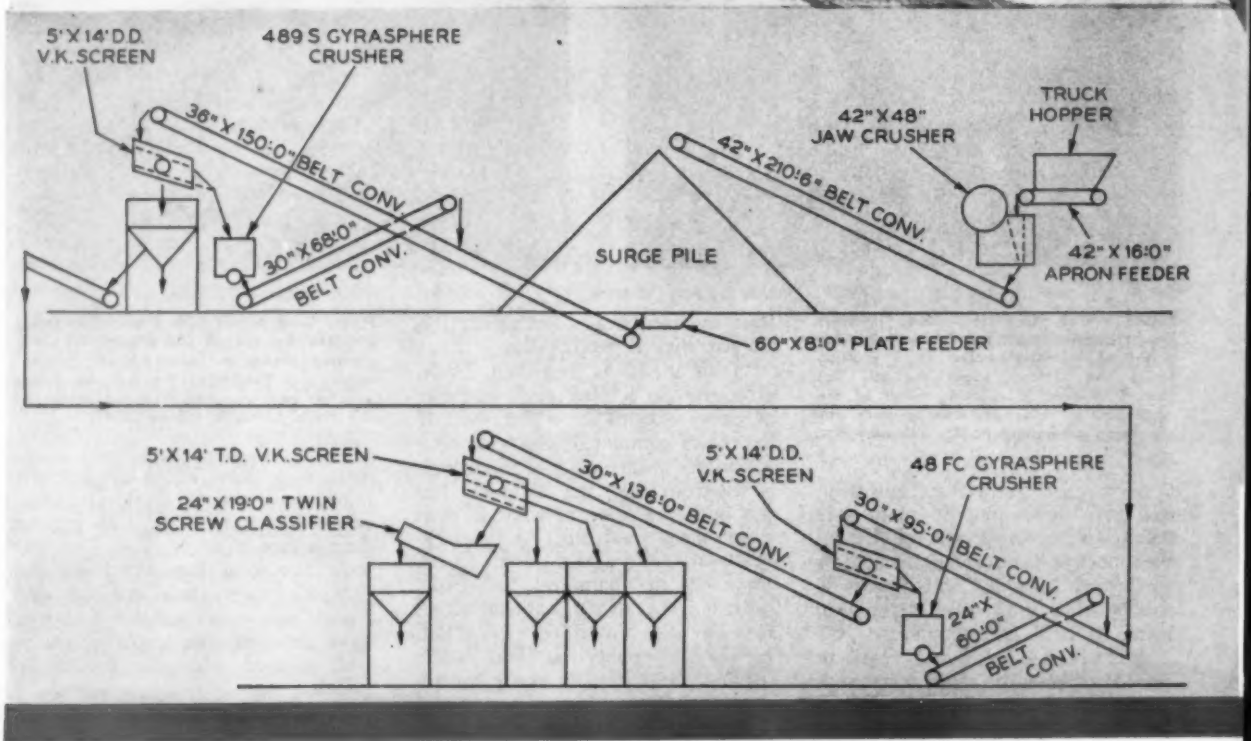
J. E. MARTIN has been elected president of the Ohio Sand and Gravel Association. Mr. Martin is associated with the Enon Washed Sand and Gravel Company, Enon, Ohio.





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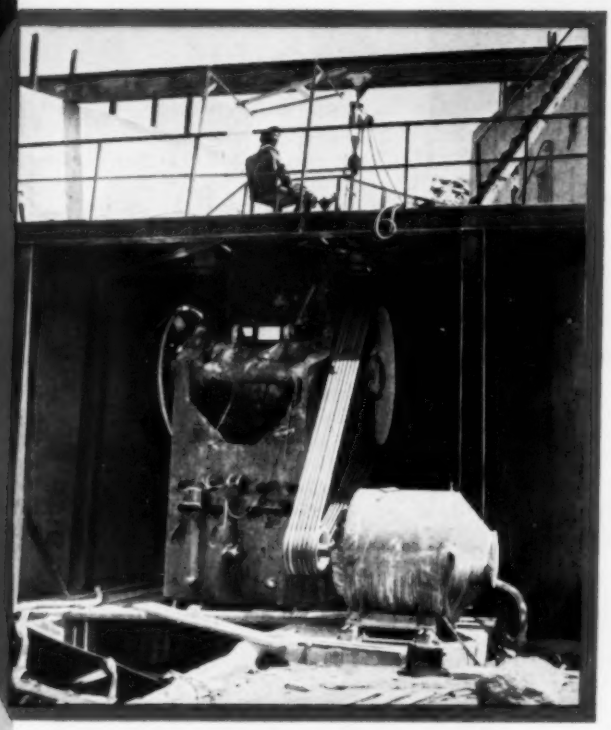

PRIMARY CRUSHING PLANT — **Telsmith 42" x 48" Roller Bearing Jaw Crusher,** with **Telsmith 42" x 16' Heavy Duty Apron Feeder,** delivers 300-400 tons hourly of minus 7" material to the surge pile. Send for Bulletin 280 describing this new, big capacity jaw crusher with welded steel frame.

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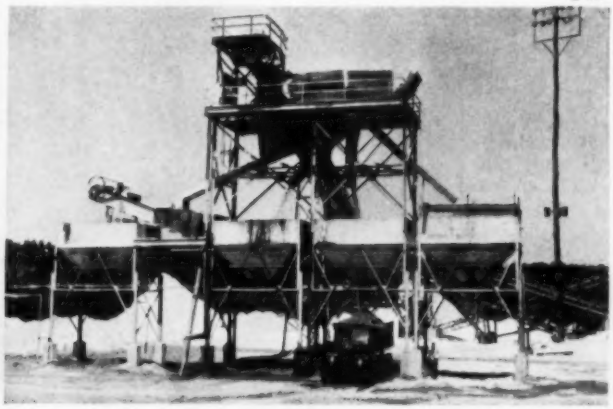
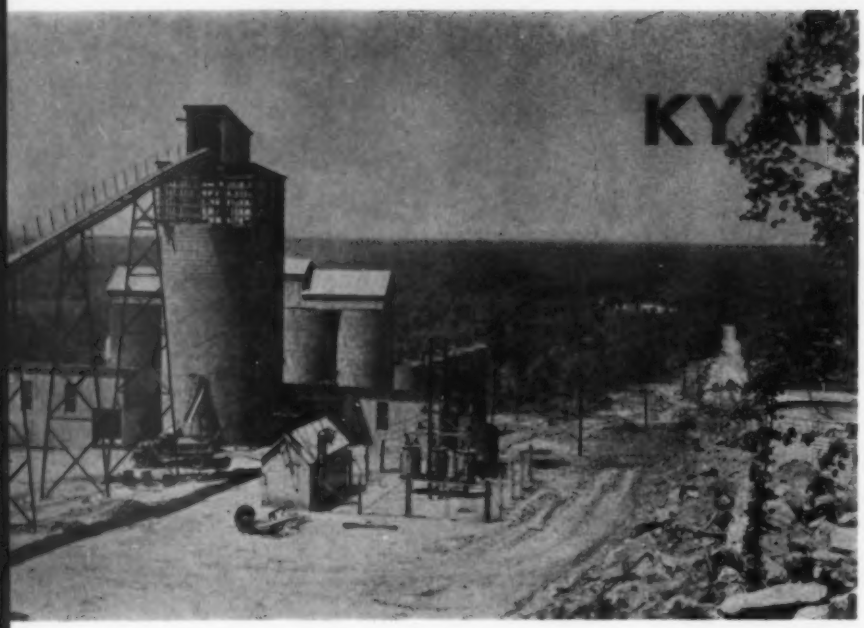
Primary Plant works 10 hours a day. The Finishing Plant works 16 hours a day, producing 3 or 4 sizes for use in batch plants and for county and state highway construction. Send for Bulletin 266 describing Telsmith Complete Plant equipment.

Telsmith 5' x 14' Double Deck Vibro-King Screen and 489-S Gyrasphere Crusher.

Telsmith 5' x 14' Triple Deck Vibro-King Screen and 24" x 19' Twin Screw Classifier.

Q-36





# KYANITE MINING CORP.

Kyanite Corporation's flotation plant and storage bins at Cullen, Va., were erected on the only flat area of any size on the mountain. At the right, going down the mountainside, is the right of way for the 10-in. primary water supply line.

ANOTHER ON THE SPOT REPORT

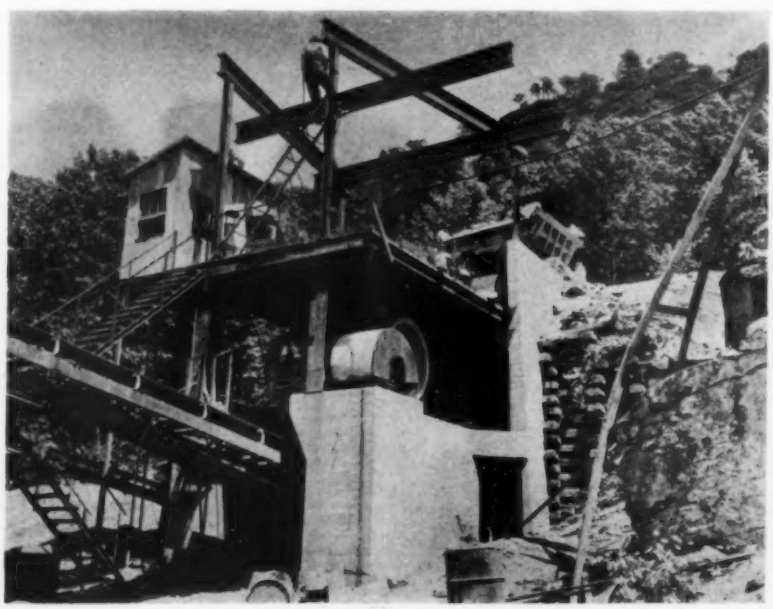
ALREADY a leading producer of kyanite concentrates —reported, in fact, to be the largest such producer in the world—the Kyanite Corporation of Cullen, Va., now has an even stronger claim to that distinction, following the recent start of operations

**By BUREN C. HEROD**

at a new mine and flotation plant on Willis Mountain near Dillwyn, in central Virginia.

Production from the new 120-t.p.d. facility joins that from the firm's older mine and flotation plant at Cullen (PIT AND QUARRY, October, 1953, p. 111) in shipments destined primarily for refractory and porcelain uses. A kiln for production of synthetic mullite is also in operation at Cullen, and at Pamplin there is a milling and storage installation.

While the finished base product of the Willis Mountain plant is classed as 35-mesh raw kyanite, and is so shipped from that location to many customers, a certain tonnage is taken to the grinding plant at Pamplin for milling to 48-, 100-, and 200-mesh products.



Primary reduction of the kyanite ore to a top size of 5 in. is done in this 32- by 42-in. jaw crusher.

## status as leading producer enhanced by new mine, plant

Prior to transport to the flotation plant feed silo (left) the ore is further reduced to a ¾-in. top size in the secondary crusher (right).

A metamorphic mineral, kyanite frequently occurs in fibrous form and is often disseminated through the host rock, as at Willis Mountain. One of the aluminum silicates group that includes andalusite and sillimanite, kyanite has been the only natural mullite-forming mineral produced in the United States in recent years.

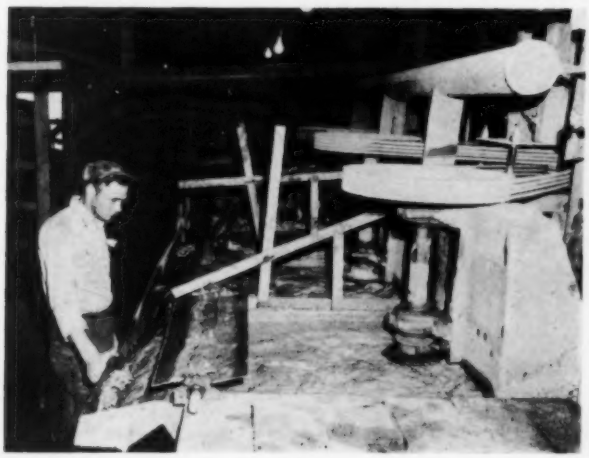
Mullite, which has a rare occurrence in nature, may be produced by the conversion of kyanite at a high temperature. Due to the relatively small grain size inherent in mullite produced from domestic concentrate, this type does not lend itself to certain uses that can be met, for example, by a coarser grade of material imported from India. However, the finer-grained product has a ready market for such use as refractory cements. Mullite refractories, while representing only a small fraction of the entire category, are nevertheless important in view of a high softening point, resistance to corrosive action, and other factors.

Since 35-mesh is approximately the upper limit of particle size for kyanite flotation, the processing and plant were designed by Gene Dixon, president of the company, to produce raw kyanite concentrate of that top size. Construction was carried out by the local crew. As placed in operation late in February, the plant incorporated a single milling and flotation circuit. However, other phases of the operation, including drying, cooling, magnetic separation, and storage, were designed and constructed to provide enough capacity to accommodate a duplicate milling and flotation circuit on which installation is currently in progress.

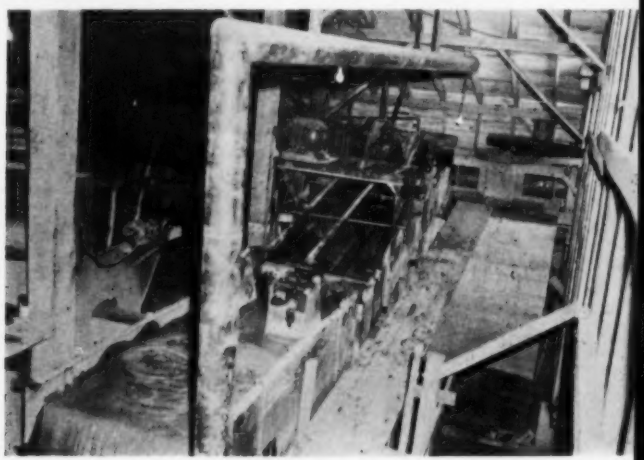
Long known as a potential mining site, Willis Mountain is a rather solitary pre-eminence on the surrounding flat land fringing the central Virginian Piedmont. Kyanite Mining Corporation acquired a part of the property in 1945, and made subsequent additions to provide the approximately 1,000 acres, nearly the entire mountain, now under control. Since virtually all of the rock mass in this elevation consists of usable ore, there is no cause for concern in regard to reserves for the operation.

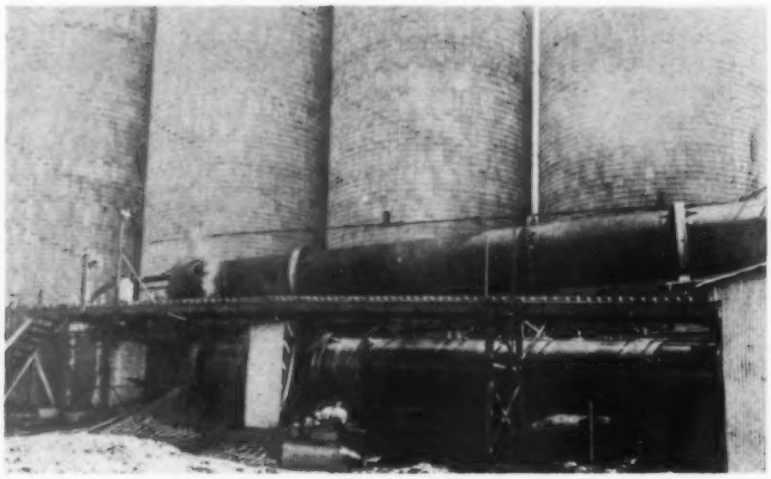
In March of last year, the first step was taken toward setting up the new operation, when timber was cleared to provide a ¼-mile road from state highway 15 eastward to the plant site. The latter was established on the only flat area of any size on the mountainside. Planning on a 9 percent grade for the quarry trucks, a haulage road was cut and filled to a higher point on the moun-

In this 6-cell launder, the minus 35-mesh product from the rod mill is processed for removal of pyrites.



Right: Underflow from the launder is fed to this double rake classifier, from which the overflow is pumped to waste. Underflow enters a conditioner for the addition of reagents before passing to the rougher and cleaner cells.





The drained flotation product, or concentrate, is transferred from the bins in the background to the dryer (upper unit). After drying and roasting at over 900 deg. F., the concentrate is fed to the cooler (below the dryer).

tain where it would intercept existing bluffs; this location provided the most convenient point for opening the quarry face.

The haulage road was completed about the first of this year, and the major part of the plant was completed by March 1. Flotation was initiated at this time, and by May 1, the dryer was installed and in operation.

In the quarrying operation, primary blast hole drilling is done with a Gardner-Denver Air Trac that mounts 3½-in. Timken carbide bits. Drilling air is supplied by a 600 Gardner-Denver compressor. While as much as 210 ft. of blast hole has been put down in one shift, the footage rate is actually variable due to the seaminess of the rock. Drilling for secondary breakage is done with a Gardner-Denver jackhammer.

Since the quarry face was only recently opened, the drilling at present cannot follow a regular pattern but must be adjusted to virgin topography above the face. Currently, the primary blast holes are drilled to provide a face about 50 ft. high, and a 7- by 9-ft. pattern is used wherever possible. Drilling and blasting operations are planned so as to carry the face around the mountain side from the opening cut to a point where a switchback can be made. From that time on, quarrying will be carried out in benching operations.

The Atlas explosives used consist of about 60 percent 2- by 16-in. charges, 40 percent 3- by 16-in. charges, and Flowdyn. Atlas aluminum caps and Primacord connectors are used to set off the shots. These components are employed so as to obviate the presence of copper in the plant feed rock, as well as possible interference by two-way radio.

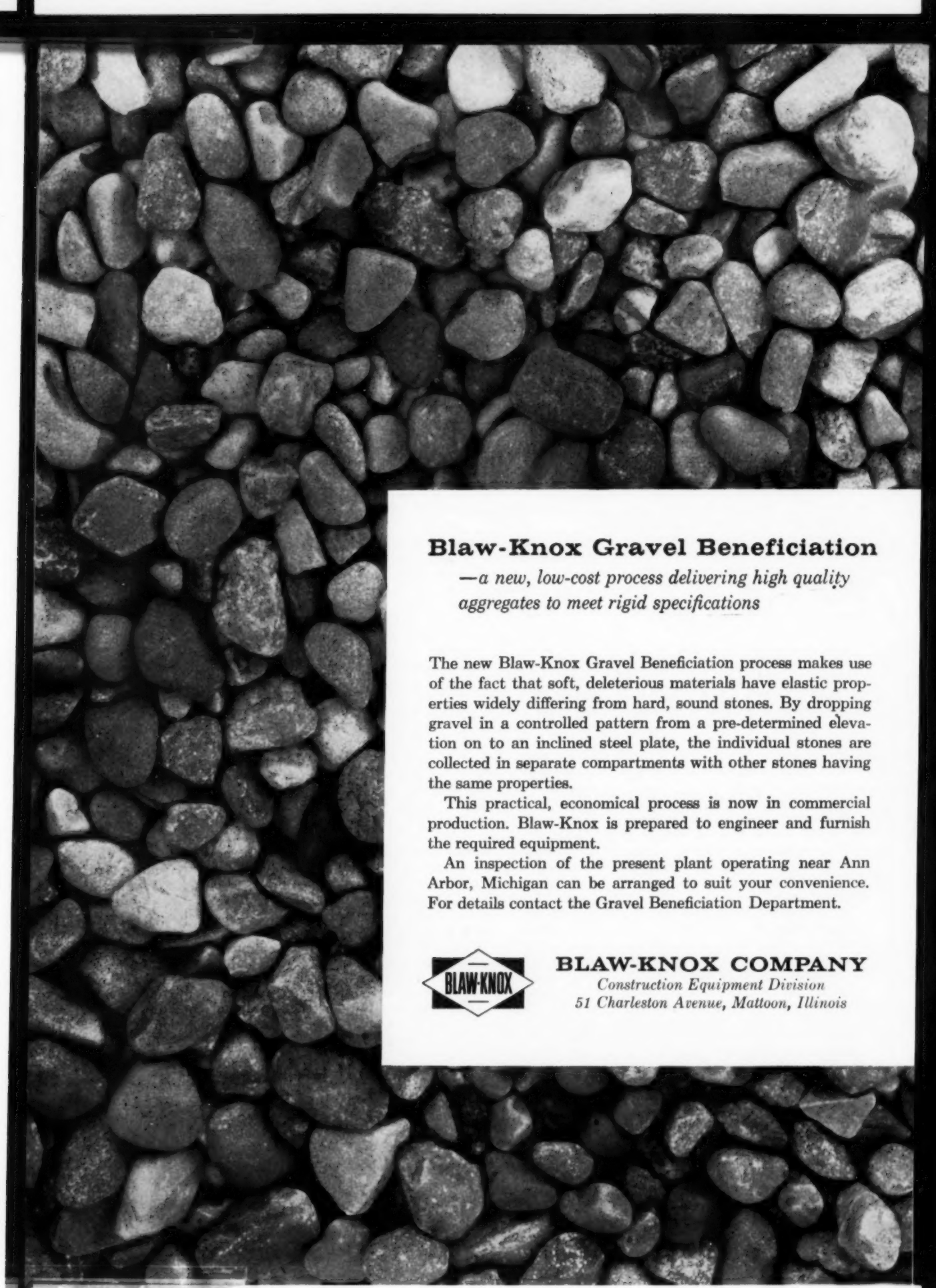
The broken rock is loaded from the face by a Northwest Model 6 mounting a 1½-cu. yd. Amsco bucket. Haulage from the working face to the plant is handled by three 15-ton Euclid end-dump trucks that deliver approximately 450 tons over an 8-hour shift. At the plant site the rock is dumped into a hopper, from which it is transferred on a Telsmith 36-in. by 14-ft. apron feeder to the primary jaw crusher. The latter, a 32- by 42-in. Birdsboro-Buchanan unit, is driven through V-belts by a 100-hp. Allis-Chalmers motor. Reduced through a 5-in. setting, the primary crusher product is discharged to a short 36-in. belt on which it is transferred to the secondary crusher.

The secondary crusher, a 489S Telsmith FC Gyrasphere, is powered by a 150-hp. Allis-Chalmers motor and processes the feed through a ¾-in. setting. Following this secondary reduction, the mill feed is transported on a 24-in. by 118-ft. inclined belt conveyor to the top of a concrete stave storage silo. With a single-capacity of 1,500 tons, this silo is 26 ft. in diameter by 50 ft. in height.

From a drawpoint under the silo the feed is transferred on a 24-in. variable-speed belt feeder with Reeves drive to the adjoining mill and flotation building. A second feeder will be added below the silo to accommodate the second mill when the duplicate system is installed.

The first step upstream from the flotation stage involves preparing a 35-mesh raw feed. Grinding to that mesh is accomplished in an Allis-Chalmers 5- by 10-ft. rod mill that is supplied by the belt feeder at the rate of 12 t.p.h. The mill is charged with 3-in. rods and is driven through herringbone gears by a 100-hp. Allis-Chalmers motor. A tumbler screen of 35-mesh screen cloth fitted to one end of the rod mill processes the mill discharge to separate the 35-mesh from the oversize. The latter is flumed to a 21-ft. Dorrco double rake classifier. Discharge from the classifier, which is installed adjacent

Taken during early stages of the pit development, this picture illustrates the nature of the topography and rock being encountered. The trucks have a favorable 9 percent grade under load.



## Blaw-Knox Gravel Beneficiation

*—a new, low-cost process delivering high quality aggregates to meet rigid specifications*

The new Blaw-Knox Gravel Beneficiation process makes use of the fact that soft, deleterious materials have elastic properties widely differing from hard, sound stones. By dropping gravel in a controlled pattern from a pre-determined elevation on to an inclined steel plate, the individual stones are collected in separate compartments with other stones having the same properties.

This practical, economical process is now in commercial production. Blaw-Knox is prepared to engineer and furnish the required equipment.

An inspection of the present plant operating near Ann Arbor, Michigan can be arranged to suit your convenience. For details contact the Gravel Beneficiation Department.

BLAW-KNOX

**BLAW-KNOX COMPANY**

*Construction Equipment Division*
*51 Charleston Avenue, Mattoon, Illinois*

and parallel to the rod mill, is picked up by scoops at the mill feed end in closing the milling circuit. Reagents and frothers, including pine oil, soda ash, xanthate, and burned motor oil are also added to the mill feed at this point by Clarkson reagent feeders.

The minus 35-mesh fraction passing the rotating tumbler screen is flumed to the first flotation phase—a 6-cell launder where pyrites are removed. The overflow from these six cells, with the pyrites, is piped down the mountain side to a waste settling area. Underflow is transferred to a Dorrco rake classifier similar to that in the rod mill circuit. Overflow from this rake classifier is piped to waste along with that from launder cells, while the classifier underflow is pumped to a four-cell conditioner. At this stage in the flotation process soda ash, tall oil, and motor oil are added by automatic feeders.

Materials used in flotation and frothing are stored, or mixed as required, in a group of tanks near the flotation plant. Four of these tanks are used for xanthate and soda ash—two for mixing and the other two to supply the reagent feeders. Two tanks each are provided for tall oil and motor oil.

The conditioner overflows to the first phase of the final two-stage flotation, a 6-cell rougher unit. From the first four cells of this unit the overflow passes to a 6-cell cleaner unit. The last two of the rougher cells overflow back to the first four cells in the unit.

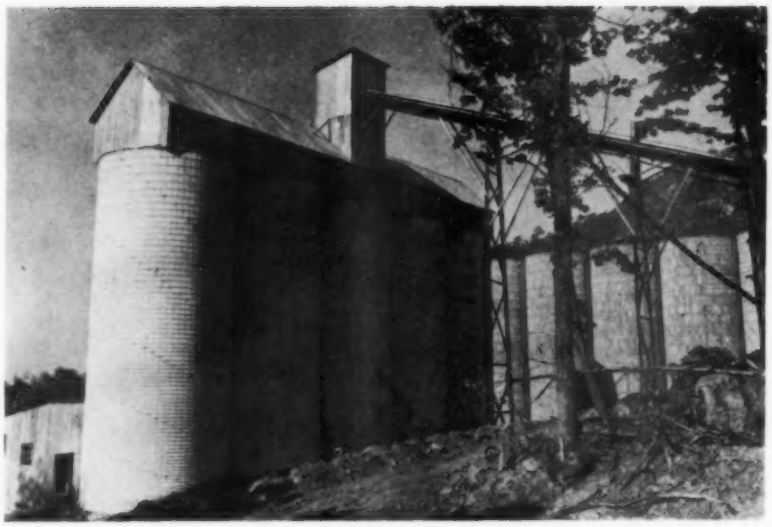
Tailings from the cleaner cells are pumped back to the rougher units. The tailings from the latter, consisting largely of quartz, may either be piped down the mountain as waste or pumped to a group of five storage silos from which they can be later drawn to supply a market for molding sands.

As the finished flotation product, overflow from the cleaners is transferred *via* a 3-in. Allen-Sherman-Hoff pump through a 2-in. line to a bank of concentrate bins. These bins, or concrete stave tanks, of which there are five, are 20 ft. in diameter by 50 ft. in height, each having a capacity of 1,000 tons. The kyanite concentrate pumped to the top of these bins is received in a company-made screw dewaterer. Following the dewatering, the material is fed to a 16-in. by 45-ft. shuttle conveyor for distribution to the various tanks.

A tunnel below the tanks houses an 18-in. by 100-ft. reclaiming belt conveyor onto which the kyanite concentrate is drawn through a manually-operated gate. The reclaiming belt feeds the boot of a 30-ft. bucket elevator in which the concentrate is raised to discharge into the rotary dryer. Fabricated to company specifications, the dryer is a 5- by 50-ft. unit with a 10-hp. Dodge torque-arm drive. A normal drying and roasting temperature in excess of 900 deg. F. is maintained with oil firing through a North American burner. The air and oil mixture for the latter is automatically regulated through a diaphragm. From the discharge end of the dryer, the material is dropped to the feed of an underlying 5- by 60-ft. rotary cooler. Provided with an external water spray, this unit is also driven by a Dodge torque-arm through a chain drive.

The cool concentrate is discharged to the boot of an elevator in which it is raised to a screen for the removal of such fused impurities as iron or refractory fragments. Screen throughs are then fed to the magnetic separation phase, which consists of eight Dings Permadrums and four Dings magnetic separators. With these units, mounted in series, a clean kyanite containing a fraction of one percent iron is processed. The pyrite rejects from the magnetic separation process are dropped to a stacker belt on which they are conveyed out of the plant to a waste pile. The cleaned 35-mesh raw kyanite leaving the separators is chuted to an 18-in. by 143-ft. inclined belt conveyor on which it is transferred to a bank of five finished product silos.

Each of the latter is 20 ft. in diameter and 50 ft. high, of concrete stave construction and has a 1,000-ton capacity. A loading station and truck dock housed at the base of these silos has provision for both bagging, with a manually operated unit, and bulk loading. All shipments from the plant, bagged or bulk, are made by truck.



**Each of these five concrete stave finished-product storage silos in the foreground has a 1,000-ton capacity. At the lower left are the bagging and loading station and the truck dock.**

As noted previously, all sections of the operation on both sides of the flow from the flotation plant were designed and constructed to handle the concentrate output of a second milling and flotation circuit. A 700 g.p.m. Ingersoll-Rand pump driven by a 100-hp. Cummins diesel is also already in operation and has the capacity to meet the additional water requirements of that expansion. This equipment pumps water over a 300-ft. head from a reclaiming pond near the waste settling area to a pair of 36,000-gal. storage tanks on the plant site.

Producing approximately 120 tons of concentrate every 24 hours, the Willis Mountain mill is operated on three daily shifts, seven days a week, with a crew of 35 men. The recent completion of this facility has strengthened the reputation of Kyanite Mining Corporation as a primary producer of that mineral. Officers of this progressive organization, in addition to Gene Dixon, president, are G. A. Dixon, vice-president, and J. Kent Early, secretary.

Harry Dixon is superintendent of the new facility. Supervisory personnel include Earl Moore, quarry foreman, and the flotation plant's three shift foremen: Clay Allen, Ed Shepherd, and F. Guthrie.

*parallel flow, big excavator factors in highly flexible*

Claude Herriman, left, general manager of Standard Materials Corp., and Paul Simpson, superintendent of the new plant.

# New Standard Materials Plant

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

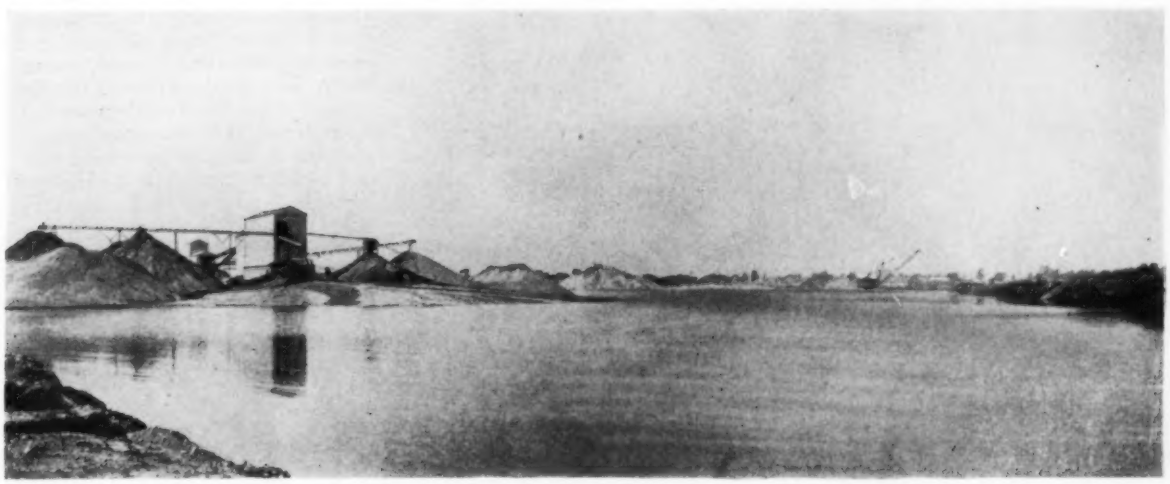
INCORPORATING the best of several ideas developed jointly by management and supervisory operating personnel, the new 400-t.p.h. plant of Standard Materials Corporation at Indianapolis, Ind., with its efficient dual processing system, meets the demand for varied aggregates of the market which it serves.

The high degree of flexibility which this new facility was designed to provide is apparent in the fact that while six basic products are normally made, as many as nine different aggregates, including sands, may be simultaneously produced. Located on highway 67 in southwest Indianapolis, the plant is advantageously situated with respect to customers and construction in both populated and rural areas. Tenth of a group of plants which the company operates in serving the Indianapolis and Terre Haute areas of Indiana, and the Louisville, Ky., region, this facility replaces an older plant on Raymond Street in Indianapolis, where the deposit had become fully depleted.

An overall view of the Standard Materials plant site and excavating area near Indianapolis.

Situated on a 738-acre tract, the new plant and its dual flow system were designed by a team comprised of Claude Herriman, general manager of the company, Max Meyers, former superintendent at this location, who now heads another of the firm's operations, and Paul Simpson, present superintendent. Construction, initiated in December, 1955, was carried out by the local crew, and the plant was placed in production six months later, in June, 1956.

While the recoverable material in



Equipped with a 9-cu. yd. bucket, this dragline handles both stripping and digging. As shown here, the material is being discharged onto a drainage pile.

The field conveyor portable feed hopper is spotted adjacent to a pile of drained pit run material and charged by the 3-cu. yd. dragline shown here.

Transported up to 1,500 ft. on the field conveyor, the feed is discharged to the primary scalper. Plus 2-in. gravel passes to the primary jaw crusher, right.

the tract varies in thickness from 20 to 50 ft., over the entire area the average is approximately 35 to 40 ft. With respect to gradation, about 65 percent of the pit run material will pass a No. 4 sieve, and the balance is pea gravel and coarser sizes. Only a nominal amount of material as large as 6 in. is encountered; and little, if any, segregation is present in the virgin deposit.

Excavating is done by dragline in a wet-pit operation. When the plant first went into production last year, a 3-cu. yd. dragline was used both for digging the material and casting it onto drain piles, and reclaiming from the latter to feed the hopper of the field conveyor leading to the plant. The former operation was conducted on one shift, and the latter on another.

This system was revised and improved subsequent to the acquisition last fall of a large dragline that had been in operation in the Kentucky strip coal mining areas. This unit, a Page machine with a 135-ft. boom, and equipped with a 9-cu. yd. bucket, is probably one of the largest now in use in the sand and gravel industry.

With the substantial excavating capacity provided by this big dragline—which handles stripping as well as digging and casting—the original machine, a 3-cu. yd. Lima, is now free of virtually all activity other than that of supplying the hopper of the field conveyor.

Principal operating components of the plant, exclusive of pit operations, include the 1,500-ft. field conveyor system, primary crushing and scalping, secondary reduction and scalping, and the final screening and washing phase in which a dual, parallel flow is established.

Among the major items of equipment, the conveying system is comprised primarily of Marco units equipped with Goodyear belting. Most of the screening is accomplished with Simplicity units. Primary and secondary reduction is done, respectively, in a Cedarapids 1036 jaw crusher and a Nordberg-Symons 4-ft. Short Head. A Wemco sand screw is installed in the sand processing flow, and washed gravel is processed through a pair of McLanahan log washers.

As noted previously, the pit operation involves wet digging and casting to drain piles. In normal operation, the large dragline casts near the mid point of a full 360-deg.

swing. Due to a high water table, only a few feet of the deposit are recovered from above the water line.

Reclaiming from the drained pit run piles is handled by the smaller 3-cu. yd. dragline which picks up and spots a portable field hopper at the most convenient point along the field conveyor in relation to the drained pile being worked.

A belt feeder below the hopper transfers the material to the 30-in. field conveyor belt on which the material is transported from the pit to the plant site. At the latter point, the field conveyor discharges to the primary scalper, a 4- by 10-ft. Seco fitted with a 2-in. opening scalping deck. Oversize from this unit is chuted to the primary jaw crusher, where it is reduced through a 2-in. setting. The primary crusher product joins the primary scalper troughs on a 30-in. by 165-ft. inclined belt conveyor on which they are transported to the secondary scalping and crushing house.

Here the material is discharged from the plant feed belt onto a 4- by 12-ft. screen which is normally fitted with 2-in. opening screencloth. The fraction retained is chuted to the secondary crusher, while that passing drops into an 80-ton bin from which it is transferred to the washing plant feed belt. Clamshell gates below the bin provide also for truck loading of this crusher run product when requested. Secondary crusher product is chuted to the foot of a 60-ft. bucket elevator in which it is raised and discharged back on the plant feed belt in closing the secondary crushing circuit.

Secondary scalping and crushing are housed in the structure in the foreground. The washing and screening equipment, in dual flow lines, is installed in the building on the right. Truck drive-throughs provide for direct loading from washing plant storage bins.

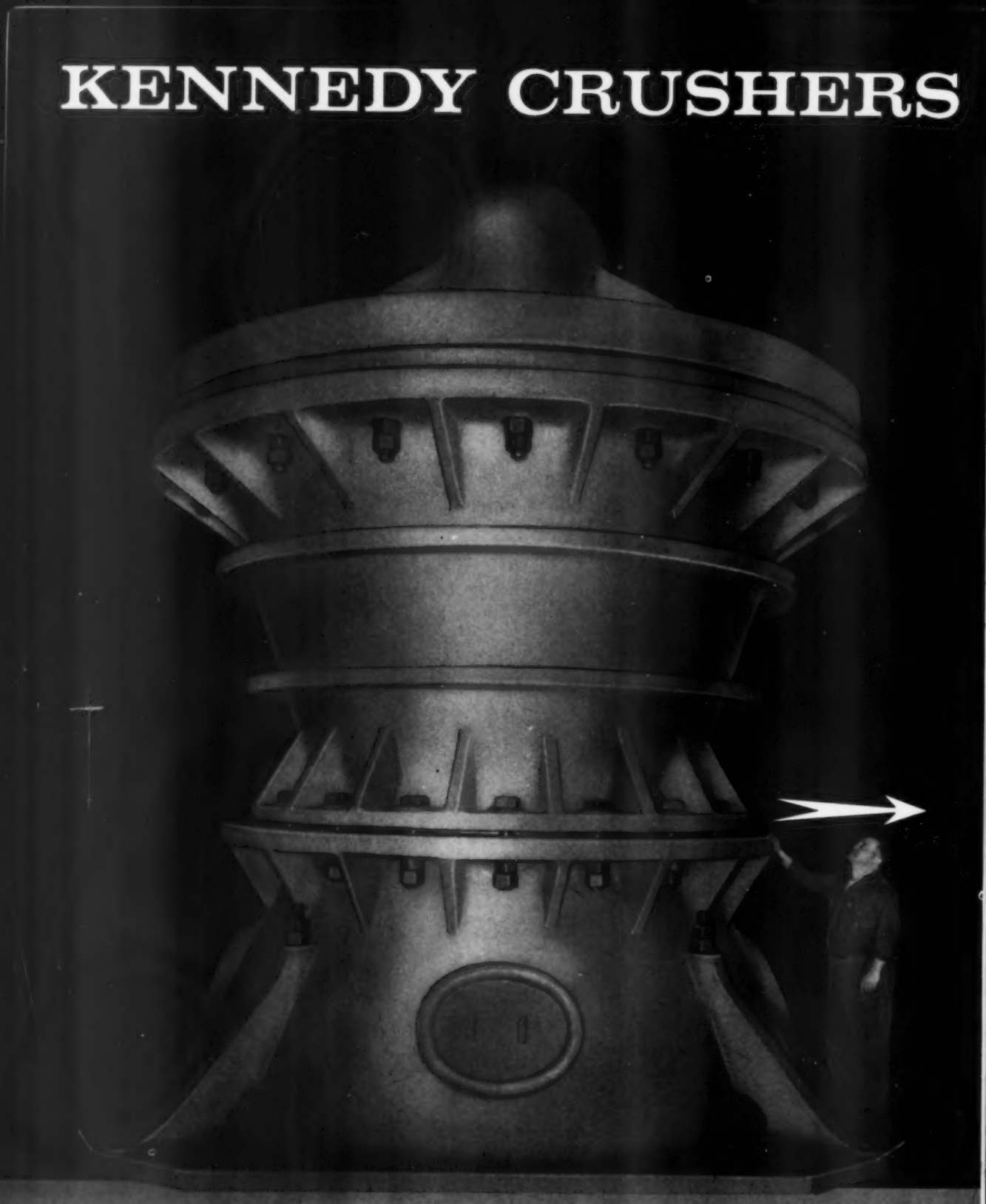
From the 30-in. by 200-ft. washing plant feed belt, material is split to a pair of 4- by 12-ft. double deck desanding screens. These are normally fitted with a 5/8-in. and 3/16-in. opening top and bottom deck screen cloth, respectively. All of the sand from one of these units and two-thirds of that from the other are delivered to the 54-in. sand screw. The latter discharges to a 24-in. by 225-ft. horizontal Barber-Greene conveyor on which this product is transported outside this plant and discharged over a sand stockpile. The remaining third of the sand from one of the sanding screens is flumed to a settling tank from which a mortar sand is reclaimed.

(*Continued on page* 130.)

Below: Truck loading from stockpile is handled by this unit and a similar one and by a clamshell crane.

Right: Each of the washing plant's flow lines incorporates a 30-ft. log washer, as seen here, as well as desanding, washing, and finishing screens.

# KENNEDY CRUSHERS



# KENNEDY-VAN SAUN

# chosen for Heavy Duty Service at the plant of Lake Ontario Portland Cement Co. Picton, Ont., Canada

The new 5000 bbl. per day dry process cement plant of the Lake Ontario Portland Cement Co., combined with a modern 6000 ton per day aggregate plant, requires heavy duty primary crushing equipment to handle hard-to-crush rock.

The Kennedy No. 48 Gearless Gyratory Crusher is designed to handle large sizes of quarry rock regardless of hardness. Chosen by Lake Ontario Portland Cement Company as being best suited to meet the requirements of the combined operation.

In addition to 48 inch primary crusher Kennedy Gyratory secondary and tertiary crushers and impact crushers are installed in this modern plant.

Let K V S engineer help *you* select crushing equipment to meet any specific condition. Consultation, at any time.

## Features which distinguish the K V S No. 48 Gyratory Crusher

- Primary Crusher
- Low-head Construction
- Gearless . . . Gyratory Type
- Synchronous Motor built directly into crusher pulley
- Power used only for crushing—no transmission loss
- All moving parts carried on roller bearings
- Produces peak capacities with minimum maintenance and operating cost

## KENNEDY PRODUCTS

- Gyratory Crushers
- Swing Jaw Crushers
- Tube Mills
- Ball & Rod Mills
- Vibrating Screens
- Rock Feeders
- Air Swept Tube Mills
- Rotary Kilns
- Coolers, Dryers
- Preheaters, Deheaters
- Belts, Conveyors
- Pneumatic Transport Systems
- Complete Aggregate Processing Plants
- Waste Heat Boilers
- Pulverized Coal Firing Systems
- Asbestos Plants
- Complete Lime Plants
- Complete Cement Plants
- Steam Generators

**MANUFACTURING & ENGINEERING CORPORATION**
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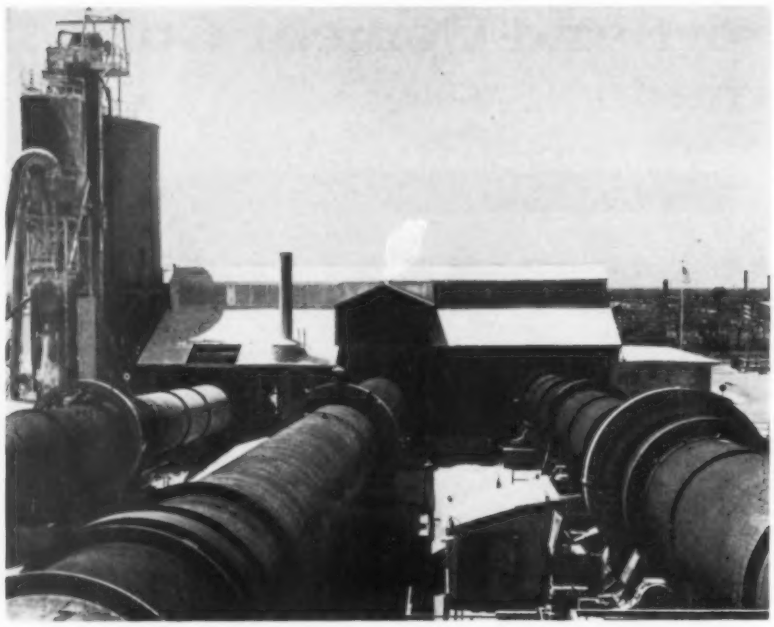
# $3,000,000 Plant Expansion Completed by Kaiser Chemicals



The center kiln is the newly-installed unit at the seawater plant at Moss Landing.

Kaiser Chemicals Division of the Kaiser Aluminum and Chemical Corporation, Oakland, Calif., has completed a $3,000,000 expansion program which substantially increases its capacity to produce refractory and magnesia products.

Additional facilities at the Moss Landing, Calif., seawater magnesia plant constituted the major part of the expansion. This equipment has doubled the seawater-handling capacity and increased by more than 50 percent the periclase-producing facilities. Periclase is used in the manufacture of basic refractories for the high-temperature furnaces of the cement, steel, glass, and copper industries.

Addition of the big new rotary kiln, with a capacity of approximately 150 tons of magnesia products per day, brings the total daily kiln output to about 375 tons.

Other items at Moss Landing included two large tanks for treating raw seawater, an additional magnesia settling tank, and new product-handling and dust-collection facilities. Two smaller tanks formerly used for seawater treatment were converted to reactors for precipitating magnesia from both seawater and calcined dolomite. Another pipe was also installed to carry seawater to the plant from the harbor.

The second part of the expansion program concerned modernization and additions at the firm's Columbiana, Ohio, basic refractories plant. Here new pressing and materials-handling facilities were added, increasing capacity by 50 percent.

### Chinor Cement & Lime Co. Enlarging Plant Facilities

Expansion and modernization projects now in progress at the Chinnor Cement & Lime Company mill in Oxford, England, are expected to be brought to completion by the end of this year and will add 300 tons of portland cement production to the plant's daily capacity.

Carried out by Vickers-Armstrong, prime contractors, the work has progressed with no disruption to operations of the older facilities, and it is reported that, to date, there has been no loss of production time. Among the various phases of the operation affected by the expansion program are crushing; slurry preparation and handling; burning; clinker grinding; and storage for clinker, gypsum, coal, and finished product.

The installation of a new 265-ft. long Vickers kiln is expected to double clinker production. This unit is fitted with a Vickers dessicator, and incorporates reflex integral recuperators for cooling the clinker. Of all-welded construction, with the exception of site joints, the shell has five cast-steel tires riding on rollers with self-aligning oil-lubricated bearings. A cyclone system will be installed to handle dust collection.

A 120-t.p.h. capacity Johnson roll crusher will double the output of the crushing plant. The crusher product will be processed through a new 30-ft. diameter washmill, from which the slurry will then flow through a closed circuit comprised of a tube mill and Dorr-Oliver sieve blend system. A new slurry agitating tank, 66 ft. in diameter, is also being provided.

Two existing clinker grinding mills, housed in a new building, are to be joined by an 8- by 45-ft. Vickers compound tube mill. The new unit, which is supplied with clinker and gypsum by constant weight feeders, has a grinding capacity of 24 t.p.h.

A new storage building being constructed over the former clinker storage area will also accommodate gypsum and coal. Bunkers from which the clinker grinding mills and coal mills are fed are supplied from storage by an overhead traveling crane with a clamshell bucket.

To handle the increased cement production, two new storage silos have been added. A conveying system between these and the modernized packhouse will be comprised of air-activated gravity-type and screw-type conveyors. To meet the growing demand for bulk cement, a new loading plant will accommodate road tankers.

## Washington News

(*From page* 12)

product, except for the World War II bulge. They reflect somwhat more accurately the actual prosperity of the average American, as reflected by his spending on personal consumption. He appears to be about 50 percent better off than in prosperous 1929, almost twice as well off as in depressed 1933, and only about 15 perecent better off than in postwar 1946. This last modest figure is rather startling in view of the widespread belief in the extraordinary economic progress since 1946.

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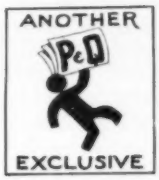
HAROLD B. ACKERMAN has been appointed district sales manager of the Huron Portland Cement Company's new Oswego District Sales Office in Oswego, N. Y.




# HELP Your Salesmen SELL

**By Robert L. Baker Jr.**
Sales Executive
Bemis Bro. Bag Company

IN order to be of assistance to salesmen whose products are shipped in multiwall paper bags, we have tried to classify the complaints, so that steps can be taken to eliminate or at least reduce complaints on packages.

It is reasonable to assume that there is a definite cause for every complaint. It is possible to remedy or correct every cause, but it is also possible that the solution may be impractical from an economic standpoint.

The initial step is to identify thoroughly and record these complaints; and both the salesman and his customer need some practical knowledge on how to do so.

Among the types of bag complaints heard by salesmen, the following are the most common:

1. Breakage noted when received
2. Failure during unloading and stacking
3. Failures during rehandling and reshipping
4. Competitor's packages don't break, and yours do; ergo his are better
5. Warehouse set
6. Brand smearing or rubbing off
7. Dirty bags
8. Over and under weights

An investigation of each of these complaints (individually) will reveal the cause or causes for every difficulty.

**Breakage On Arrival** Usually this condition is the result of in-transit damage, although occasionally (but rarely) broken bags are inadvertently loaded at the plants where they are filled. In-transit damage normally is serious only in rail shipments and is usually the result of one of the following: shifting; rough roadbed and bumping; poor cars, splinters, holes, leaks, etc.; incomplete car preparation; or careless loading.

**Failures in Unloading And Stacking** Bag failure during unloading and warehousing is usually due to exposure to certain factors that have reduced effective strength. Among the possible factors are the following:

*Damage in transit not sufficient to cause failure until handled.* Example: chafing or snagging of the outer ply or outer two plies. This condition is frequently found on the *bottom* layer of bags.

*The product is excessively hot when packed.* Heat drives moisture from the paper, which drastically reduces the vital tearing resistance of the paper. The paper "rattles" and is brittle. Extreme heat actually chars the paper.

*Bags are wet,* due to leaking car roof, sides, door, or floor.

*Paper is dry.* This may occur when empty bags are exposed to dry atmospheric conditions for extended periods. Usually it happens during the hot dry summer months or cold, dry winter months .

*Bag is too large.* A bag that is too large for its contents develops excessive buckling, or bends in the middle, throwing too much strain at that point. The result is a pressure-type break.

*Improper handling* due to a failure to realize that a multiwall paper bag has physical limitations. Rough handling, excessive dropping, poor equipment, and carelessness all contribute to improper handling.

*Damage in rail cars at door posts* from the shifting of the load.

**Failures During Rehandling** Failures during rehandling and reshipping usually fall into two categories: (1) those resulting from improper handling and inadequate storage; and (2) those that are actually the culmination of bag damage in previous handling. Every handling of bags tends to "take something out of the bag." Any previous damage, such as slight chafing, results in weak spots that may fail as rehandling takes the bag nearer the ultimate consumer.

**Preference for Competitor's Product** The report that your competitor uses a better bag, etc., cannot be dismissed as fictitious, but it cannot

**In the May, 1957, issue of PIT AND QUARRY, we published an article entitled "Stop Bag Breakage! $ave Lost Dollars," on which we have received many compliments. In this article, Robert L. Baker Jr., sales executive of the Bemis Bro. Bag Company, gave much sound advice for users of bags, based on his wide experience in the field. He now follows this up with the accompanying article, which is aimed to help the salesman of any product that is packaged in multiwall paper bags.**

be evaluated without complete factual analysis. While such reports are usually erroneous, any difference in performance is normally caused by a variation in construction, size, or some external factor.

**Warehouse Set** Warehouse set is the result of storage and atmospheric conditions. If the chemical nature of your packaged product requires the use of a moisture-resistant ply (or plies), the degree of product affinity to moisture should determine the type of moisture-resistant ply required. The duration and conditions of storage are definitely contributing factors.

**Smearing** Complaints of ink smearing or rubbing off from the bag on hands and clothing may be due to several conditions. While there may be some variation in the rub resistance of inks used by multiwall bag manufacturers, in general they are as satisfactory as can be supplied and still maintain other vital ink properties of skid resistance, color depth, gloss, etc. However, even these high-quality inks will rub off; so will the ink on our printed paper money, which we acknowledge as excellent printing!

The amount of printing and the location of printing on this bag may be other factors. Bags are normally handled by grasping the ends and lifting. This brings the edge or gusset of the bag in contact with the carrier. The amount of "rub-off" is in direct proportion to the amount of ink coverage on the edges and the ends of the bag.

**Dirty Bags** According to accepted terminology, "dirty" bags are those that are covered with some of the contents with which they are filled. Filled bags can become "dirty" during packing or loading, or in transit. Here are some reasons why bags get "dirty" during packing and loading: old and/or out-of-adjustment packing equipment, inadequate dust collectors, incorrect bag or valve size, dirty conveyor belts, poor handling methods, and improperly pasted bags.

A complete inspection of the packaging system by a qualified specialist is the first step toward improvement. Several methods of cleaning filled bags are being used with moderate-to-good results.

Product that accumulates on bags during shipment is the result of bag breakage in transit* or spillage or leakage through the valve.

Spillage or leakage can be materially reduced by making certain that valve and bag sizes are correct; that the proper valve flap extension is used; and that there is the minimum of valve distortion in loading. Twisted or distorted valves do not seal properly. Bags should always be loaded as nearly flat as possible.

*See PIT AND QUARRY, May, 1957, page 74, *Stop Bag Breakage*, for an analysis and corrective steps.

**Overweight And Underweight** The problem of overweight and underweight bags is usually caused by malfunctioning of the packaging equipment. The corrective step is to consult the manufacturer of the equipment. Secondary causes for off-weight bags may be improper valve or bag size, high air resistance of the bag, or obstruction of the packer spout opening caused by the valve flap of the bag.

Individual companies have their own procedures for handling these complaints, but the following suggestions are outlined as a guide to complete investigation.

1. Investigate personally and promptly
2. Get the complete story.
   - A. Location of broken bags
   - B. How many?
   - C. When and where?
   - D. Type of failure
   - E. Why? (if possible)
   - F. Get samples
   - G. Take photographs
3. Look for unusual conditions.
   - A. Handling
   - B. Personnel
   - C. Storage
   - D. Equipment
   - E. Weather
   - F. Carrier-routing
4. Inspect the carrier, if possible.
   - A. Car condition
   - B. Amount of shifting
5. Notify the carrier.
6. Notify the bag manufacturer.

## Standard Materials

(*From page* 125)

Those fractions retained on both decks of each desander (plus 5/8-in. and 3/16- or 1/8- by 5/8-in.) are chuted to the respective one of the two 30-ft. log washers next in the flow. Following each log washer in the two parallel flow lines is a 4- by 12-ft. triple-deck washing screen. Both are fitted with 3/4-in. top, 5/16-in. middle and 3/16 in. bottom deck screen cloth. Those fractions retained on the upper two decks of one of the washing screens are chuted to a following finishing screen. The top two fractions from the companion washing screen, however, may either be set to the succeeding finishing screen, or by-pass this unit in case of blending with other products.

Pea gravel retained on the 3/16-in. opening bottom decks of the two washing screens may either be chuted to two of the six underlying 60-ton capacity bins, or, in the event these are full, it may be sent to a 24-in. by 200-ft. horizontal Barber-Greene conveyor for transport to outside stockpile. Water and fines from the washing screens are flumed to a drainage and settling area.

Both of the finishing screens are 4- by 12-ft. double-deck units fitted with 1 1/4-in. and 1/8-in. opening screen cloth on the top and bottom decks, respectively. From the top deck of one of these units, in the event that greater production of a particular size is required, that fraction is sent to an 18-in. by 160-ft. horizontal belt conveyor on which it is returned to the secondary crusher house. Otherwise, all fractions from both screens are chuted to their respective underlying bins.

Further flexibility in making a variety of products is provided by another screen in the secondary crusher building. This unit, fitted with 3/4-in. and 3/16-in. opening screencloth on the top and bottom decks, may be fed the entire secondary crusher product *via* a flop gate at the bucket elevator discharge point. The fraction retained on the bottom deck is then returned on a belt conveyor to one of the finishing screens for blending with pea and other round gravel. The other fractions of this intermediate screen are chuted to the plant feed belt that discharges over the second scalper.

While the bulk of the plant's six basic products are consumed as ready-mix aggregate, the market for bituminous aggregate is steadily growing. In addition to the foregoing, a substantial quantity of crusher run material is delivered for maintenance on state roads.

All deliveries from this facility are made by contract haulage or in customers' own units. Loading is accomplished through clamshell gates on the bins underlying the screens in the washing plant, and from outside stockpiles by an Athey Hiloader, a Nelson loader, and a clamshell crane. Deliveries are weighed out over a 50-ton Winslow truck scale.

Operations in this unusual new facility require only a 12-man crew, which is headed by Paul Simpson, superintendent.

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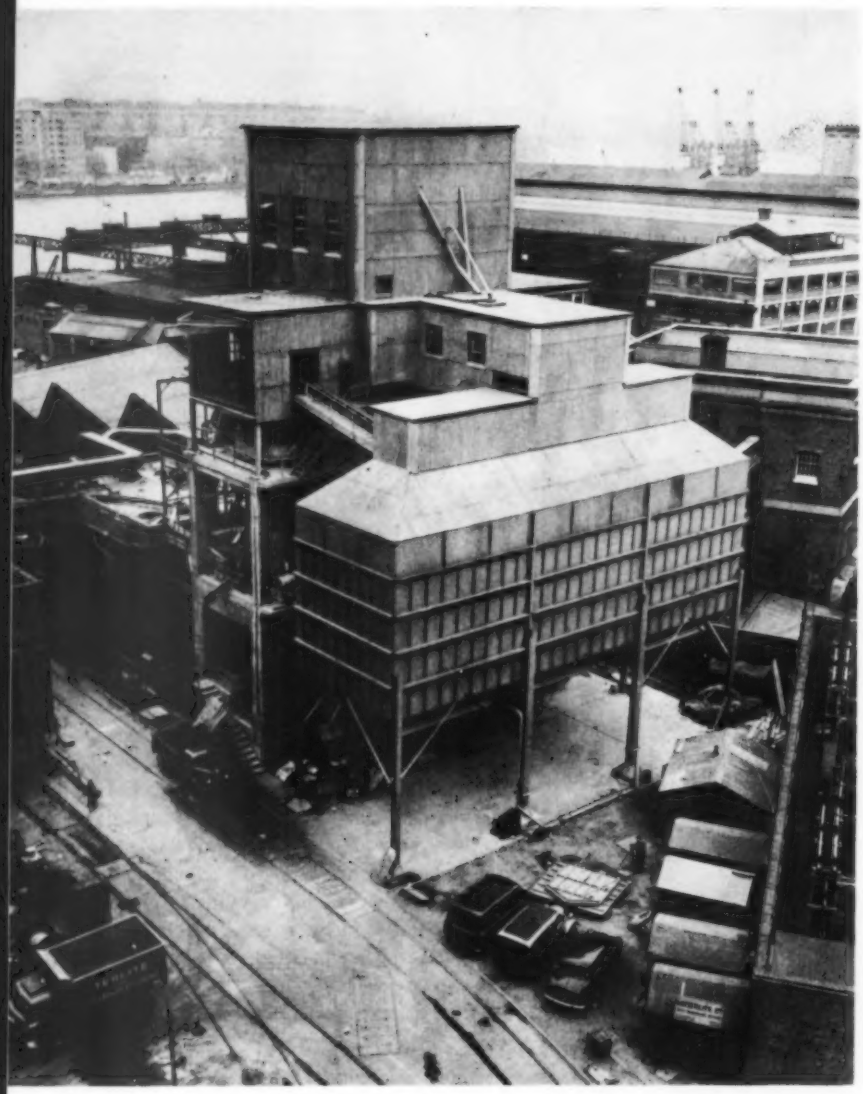
# Terlite—

By JOHN GRINDROD, B.A.(Com.)



This top-side view shows the Terlite research plant at the Battersea power station, London.

IN the hope that it will help solve at one stroke, two pressing national industrial problems—the provision of a lightweight aggregate for building purposes and the efficient and economical disposal of power station pulverized fuel ash—a full-scale research plant for the conversion of its ash was placed in operation recently at the Battersea Power Station of the Central Electricity Authority, London, England. Terlite lightweight aggregate now being made there by Cementation Company Limited is expected to the prove of outstanding interest to the building industry.

If, as is almost certain, results at Battersea confirm small-scale research already conducted in this field, a national nuisance will be transformed into a national asset. Although highly efficient, the practice of burning pulverized coal in power stations has been posing an ever growing disposal problem for years, and the amount of residual ash, emerging in a very finely divided form and therefore difficult to transport, has been rapidly increasing to the extent that the quantity which must be disposed now approaches 4,000,000 tons a year.

While the volume of ash for disposal steadily mounts, the cost of disposal per ton also tends to rise, and the Central Electricity Authority has had to pay an average of about 5s. a ton (up to the maximum of £1 a ton) for getting rid of this hitherto waste material. In addition, there is the physical problem of finding a place to dump the stuff.

So far, attemps to reduce these costs by finding commercial uses for pulverized fuel ash, as, for example, in brickmaking, cement replacement, bitumen filler, have met with only very modest success, and the amount so used has not been more than perhaps 5 percent of the total volume.

In its search for a solution to the pulverized fuel ash problem C.E.A. asked the Building Research Station a few years ago to investigate the possibility of producing a lightweight aggregate from it by the sintering method. In the meantime, independent experiments particularly by Dr. Somogyi, through his company, Sinterlite Limited, had produced on a laboratory scale a product that appeared to be satisfactory. The Building Research Station reported favorably on both this product and the manufacturing method.

In addition to being of importance to C.E.A., these developments aroused the interest of the Cementation Company of London. However, since the work so far had been done only on a laboratory scale, neither C.E.A. nor the Cementation Company could assess the economics of commercial production without building a full-scale research plant.

To this end, therefore, the Cementation Company, in collaboration with C.E.A., decided to have a full-scale research plant erected by Sinterlite Limited at the Battersea Power Station. This is the

# Lightweight Aggregate

## British research plant product solves industrial problems

world's first large-scale plant erected for the production of a lightweight concrete aggregate from pulverized fuel ash by the sintering process. By agreement with C.E.A., the Cementation Company is bearing the cost of the main plant (about £260,000) while C.E.A. is financing the pulverized fuel ash delivery system and the exhaust gas system (believed to be about £100,000).

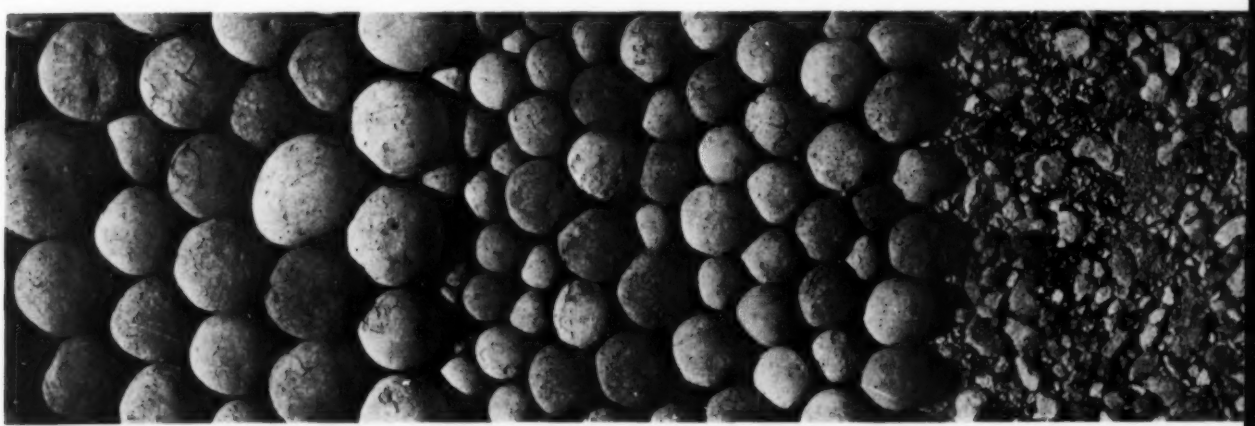
For several reasons, the Battersea Power Station was chosen as the site of the plant: (1) the cost of ash disposal here was higher than average, being about 8s. a ton; (2) the transportation of ash through London creates a nuisance; (3) there might be a ready use for any waste heat recovered; (4) its central location facilitated supervision of research by both the Cementation Company and the C.E.A.; (5) and London provided a major outlet for the sintered product.

The cost of the initial plant at Battersea is probably much higher than the cost of subsequent plants at other power stations. For physical reason, the Battersea Terlite plant could not be integral with the power station plant proper, and special foundations had to be provided. In addition, to give C.E.A. an assurance of continuity of operation, the plant has been built in duplicate. A single-unit plant integrated with the power station at Battersea would have cost far less, with comparable savings in the cost of pulverized fuel ash delivery and gas exhaust systems.

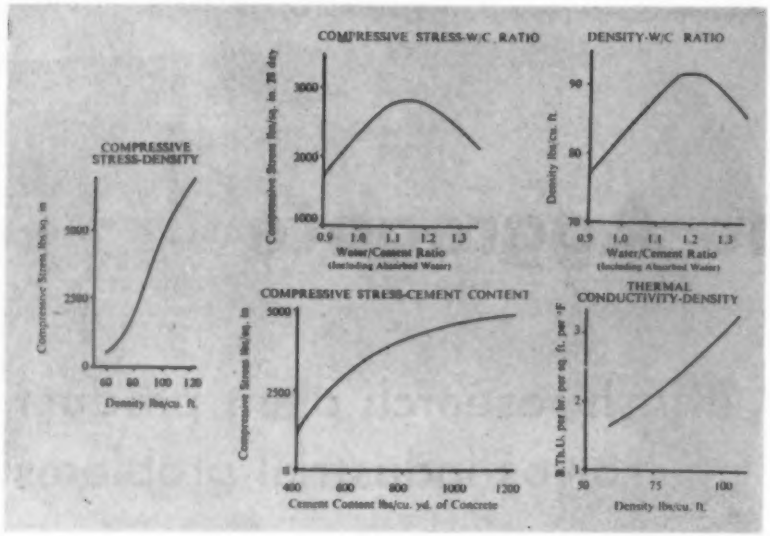
On leaving the electrostatic precipitators of the power station, the ash is first delivered into bunkers. From these it is fed into a shallow circular pelletizer, revolving at an angle, where it is sprayed with water. In this revolving pelletizer, gravity and centrifugal force cause the damp ash to form into small balls. The size of the balls is determined and regulated by the speed of the revolution and the tilt of the pelletizer. On being formed, the pellets spill over the rim of the pelletizer tray into a conveyor *en route* to the kiln, which is the heart of the sintering plant.

One kiln, measuring about 40 ft. high by 10 ft. in diameter, has been erected in each of the dual units, and each is constructed of welded-steel plate lined with refractory bricks. Each kiln has an annual capacity of about 50,000 tons of Terlite.

As there is enough carbon in the pulverized fuel ash to support combustion, no fuel is needed in the kiln other than that required to kindle the fire at the start. Not only all the carbon is driven off in the



**In this photograph are shown the actual sizes of the three grades of aggregate produced at the Terlite plant.**




These graphs illustrate the properties of Terlite and those of the concrete made from it.

sintering process, but also any sulphur and other volatile compounds, rendering the final product completely inert.

In the continuous process the pellets slowly descend from the top of the kiln until they reach a revolving grate at the base. Through suitably shaped apertures in this grate, designed to break up the larger clusters, the sintered pellets emerge to be screened, graded into sizes, and stored in hoppers.

Regulated by means of instruments linked with thermocouples located at strategic points inside the kiln, the rate of combustion and the temperature in the kiln, which attains the maximum of about 1,400 deg. C., are controlled by the draught in the kiln.

Since the Battersea plant will have a substantial output right from its inception, a start has already been made in developing in Britain the weight- and cost-reducing building techniques associated with the use of good, cheap, lightweight aggregates. This material will normally be produced in ¾-, ⅜-, and 3/16-in. sizes and down, conforming admirably to the requirements of such modern building techniques.

Because pulverized fuel ash tends to vary slightly in chemical composition and other characteristics according to the coal used, investigations will be made to find out what modifications, if any, may be required in plant design and operation to adapt the Battersea process to ash produced elsewhere, and the duplication of the unit at Battersea will facilitate these.

It is also hoped that research can be carried out into several fields: the extraction of iron oxide for use by the steel industry from pulverized fuel ash; the collection of germanium oxide for use in electronics from the dust of the exhaust gases; and the recovery of waste heat, *e.g.*, for central or industrial heating, from the whole process.

Typical weights of aggregates composed of Terlite are approximately as follows:

Large ¾-in. to ⅜-in. . . . . 48 lb./cu. ft.

Medium ⅜-in. to 3/16-in. . . . . 50 lb./cu. ft.

Fines 3/16-in. down . . . . . 52 lb./cu. ft.

Although concrete made with Terlite is light, it is strong. Typical concrete weights, varying with the mix, are:

68 lb./cu. ft. for an 8-1 no fines mix giving 600 p. s. i. crushing strength.

92 lb./cu. ft. for a 3-2-1 mix giving 3,000 p.s.i. crushing strength.

At about 0.025 percent in each case, the moisture movement and drying shrinkage of Terlite concrete are very low. It is completely inert and free from combustible or sulphurous matter—ensured by the high-temperature preparation process.

Terlite, a good insulator, also has a low density, and the heat conductivity of concrete made from it is about one-quarter that of traditional concrete; and it is also highly resistant to fire and provides a high degree of insulation against noise.

Since no capillary action takes place in the material and it will not soak the water out of plaster, Terlite provides an excellent bond for the latter. Nails can be driven into it as easily as into hardwood, and it can be sawn cleanly.

The expected confirmation from the Battersea project that some millions of tons a year of this new building material can be made available will make possible a conservation of other materials. It also will permit a saving of around £1,000,000 a year in the cost of disposing of a hitherto waste product, thereby helping to keep down the cost of producing electricity. In addition, the reduced transport and dumping of the unwanted pulverized fuel ash will help to preserve good public relations.

---

Directors of the Flintkote Company, East Rutherford, N. J., have elected WILSON HARVEY, JOHN LEGH-JONES, and RICHARD G. WACE vice presidents.

Mr. Harvey is general manager of the Pioneer (West Coast) division; Mr. Legh-Jones is managing director of the Industrial Asphalts Company, Ltd., a European subsidiary; and Mr. Wace is general manager of the Flintkote Company of Canada, Ltd.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# Reversible Reject Conveyor Solves Separation Problem

SOME of the best rock men in the Southeast have tried unsuccessfully in the past to overcome the mining challenge presented at Lee County, Ga., where underground caves of coral and limestone are bedded with clay and gumbo. Nature's challenge has yielded finally to the methods adopted on May 16, this year, by the Albany Limerock Corporation, Albany, Ga.

James Dykes of Cochran, Ga., president of the Albany Limerock Corporation, and owner of the Acme Construction Company, has in full-scale operation between Albany and Dawson, Ga., a complete closed circuit scalping, crushing, and screening plant for the production of aglime and specification road stone.

Major components of the plant are a portable Universal 3645 Impact Master fed by a 9-in.-pitch, 16-bar, 36-in. wide Universal Wobbler feeder. Both crusher and feeder are mounted on a steel truck frame with three axles. In dry rock this plant is rated at 150 t.p.h.; and to date, it has averaged 1,000 tons per day of agstone and specification road stone.

Albany Limerock Corporation, to make a profitable operation of the material at hand, found it would be necessary to conduct a major scalping operation ahead of the crushing operation to prevent clay from contaminating the finished material. The natural material contains 6 to 8 percent moisture, and its gummy characteristics presented severe pre-crushing separation problems. Economic factors also made necessary the salvaging of as much separated material as possible.

The Universal Wobbler feeder, ahead of the Impact Master, solves the problem for the Albany Limerock Corporation through a reversible reject-conveyor installed under the feeder. Added economy with the Wobbler feeder is said to come from the fact it eliminates the need for a washer in the Albany Limerock Corporation setup.

The coral limestone is quarried by drilling 18-ft. holes in the limerock with a wagon drill powered by a Chicago Pneumatic compressor and blasting with 40 percent dynamite. The material is then loaded into 6-cu. yd. Ford dump trucks with a Caterpillar Traxcavator, hauled to the plant, and dumped into the feeder.

Ten percent of the feed material passes through 3-in. openings between the Wobbler bars. If the ma-

(*Continued on page* 146.)

**Left: An overall view of Albany Limerock Corporation's closed-circuit scalping, crushing, and screening installation, Albany, Ga.**

**Left, below: This closeup view of the portable crusher shows the feeder, the crusher, and the reversible reject conveyor (extreme left).**

**Below: Coral limestone bedded with clay is quarried and carried to the feeder in 6-cu. yd. loads by dump trucks.**

# "Eucs" pace production at Nelson Crushed Stone Ltd.

Powered by a 300 h.p. engine with 10-speed transmission, this 22-ton Rear-Dump Euclid has a top travel speed of 32 m.p.h. with full payload . . . one of the reasons "Eucs" haul more tonnage at lower cost.

The limestone quarry and plant of Nelson Crushed Stone Ltd., north of Hamilton, Ontario, is one of Canada's newest and most modern operations. This stone plant, with a capacity of more than 500 tons per hour, was designed for maximum efficiency and flexibility—it can produce virtually any size stone.

Three 22-ton Rear-Dump "Eucs", loaded by a 2½ yd. shovel, haul dolomite to a primary crusher about ¼ mile from the face. Equipped with quarry bodies having flared sides that facilitate loading and minimize spillage, these "Eucs" have 300 h.p. engines and 10 speed transmissions.

Rear-Dump Euclids are standard off-the-highway hauling units in mines and quarries because of their ability to stay on the job year after year with low maintenance cost. For a production and cost estimate on your operation get in touch with your Euclid dealer . . . there's no cost or obligation.

Rugged construction of the body and frame enables "Eucs" to withstand the impact of loading rock and other heavy excavation with large loading equipment. Here a 2½ yd. shovel loads 22 tons of dolomite for haul to the primary crusher.

**EUCLID DIVISION** GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

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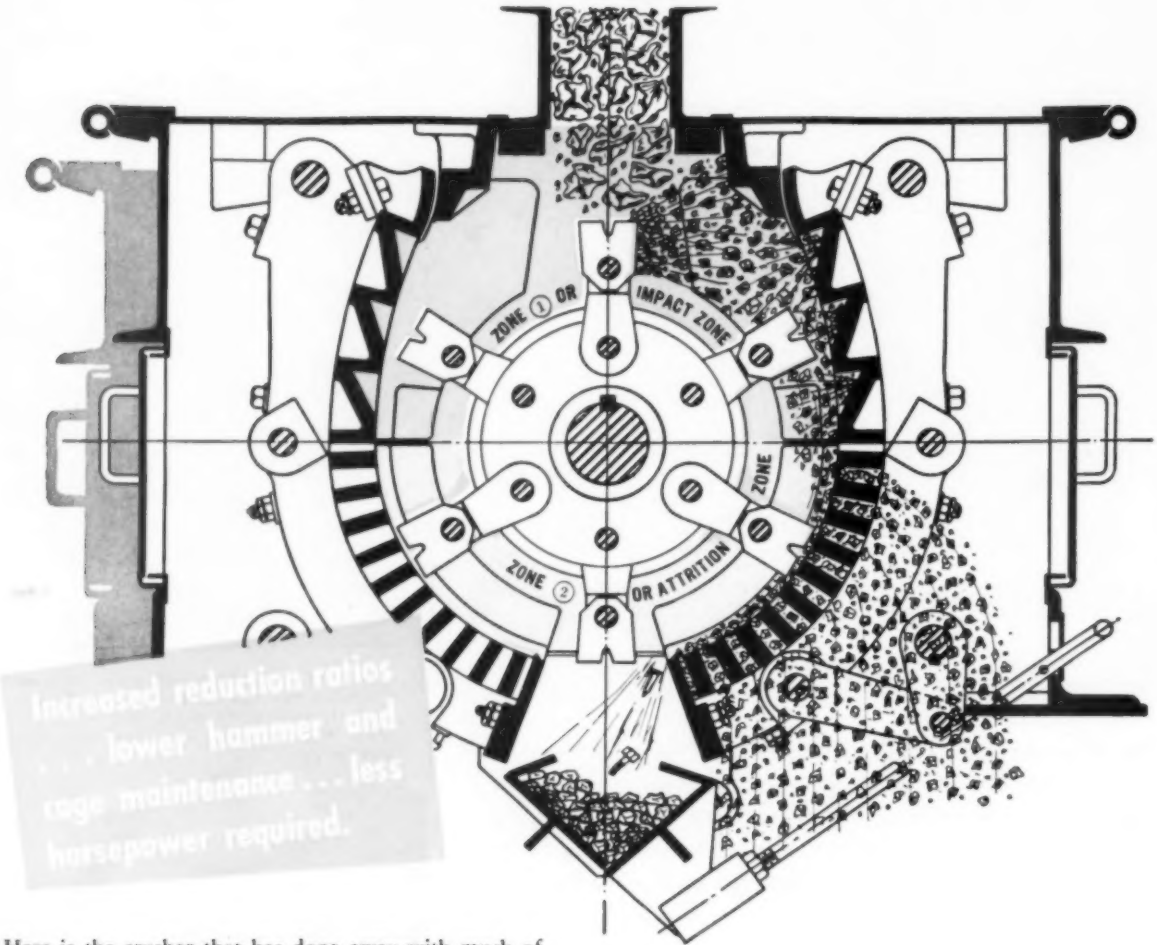


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Here is the crusher that has done away with much of the wear on screen bars and hammers that is expected in hammermills of conventional design. Examine the illustration above. Note that most of the size reduction takes place in the upper or impact zone by free air impact, without any attrition action. Only when particle size is greatly reduced does material being crushed reach the attrition zone where hammers force feed through the cage bars to give a uniform sized product. Thus attrition and wear is held to a minimum. Then too, the reversible feature doubles hammer life and eliminates down time and labor cost of turning hammers. Ask for Bulletin No. 1034 that gives complete details.

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# More Information, Please

**Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.**

**AIRSTREAM CONVEYORS—THE AUTOMATIC ANSWER TO BULK HANDLING,** a new bulletin (No. 530) published by *Draco Corporation,* presents detailed technical information on how pneumatic conveying equipment has solved bulk materials handling problems. System diagrams of typical installations illustrate the applications and flexibility of these conveyors. **(1)**

**JEFFREY TRANSMISSION PRODUCTS** (Catalog 914) lists the *Jeffrey Manufacturing Company's* line of transmission products and describes their uses in elevating and conveying machinery. Descriptive information includes drawings, as well as tables of dimensions **(2)**

**APPLICATIONS, RANGES,** and detailed literature references are given in the new (1957) edition of the *Bailey Meter Company's* Annual Bulletin G15-1. Data cover transmitting, recording, indicating, and controlling instruments. **(3)**

**HIGH TENSION BELTS,** industrial water hose, and balanced belt construction are topics covered in three folders issued by the *Boston Woven Hose & Rubber Company.* (Air-water hose is also described in the second folder.) All are fully illustrated. **(4)**

**TECHNICAL CATALOGS ON WIRE ROPE** released by the *Macwhyte Company* feature use and care of wire rope, aircraft products, wire rope slings, wire rope assemblies, yacht rigging, excavating equipment, logging, and Monarch Whyte strand. **(5)**

**FINGER TIP FACTS** (Bulletin 145) offers specific information on the *Cleveland Worm & Gear Company's* standard line of speed reducers and a selection of specially built units and integrated assemblies. A handy booklet filled with informative material. **(6)**

**ALLIS-CHALMERS CAR SHAKER,** a publication of the *Allis-Chalmers Manufacturing Company,* describes features of this device responsible for increases of up to 750 percent in unloading volume. **(7)**

**CRUSHING, SCREENING, WASHING, LOADING, AND CONVEYING EQUIPMENT** of *Universal Engineering Corporation* are presented in a new condensed catalog of the firm's product line. Includes illustrations and specifications. **(8)**

**DYNAFACTS,** a brochure on vibration control and bonded rubber products issued by the *Lord Manufacturing Company,* contains information on Lord's Analog Computer, marine engine vibration, Dynashock mountings, and related topics. **(9)**

**SPECIFICATIONS, LIST SIZES, AND OPERATING CHARACTERISTICS** of standard conveyor drill bearings are given in a factual catalog recently issued by the *Arguto Oilless Bearing Company.* **(10)**

**ORIENTED DIAMOND DRILL BITS** are described in the new general catalog of *Hoffman Bros. Drilling Company.* Lists sizes, setting charges, weights, and uses for all standard bits. Latest price sheets are available upon request. **(11)**

**FORMULAS APPLICABLE TO AIR SEPARATION** is a publication of the *Universal Road Machinery Company* (R. M. Gay Division). Contains a cutaway view of the Gayco centrifugal air separator. **(12)**

**A COMPREHENSIVE GUIDE TO SAFETY EQUIPMENT** is comprised in Catalog 10, recently published by the *General Scientific Company.* General specifications and recommended uses are given for several hundred items. Equipment is grouped according to function. **(13)**

**PHILADELPHIA GEAR WORKS, INC.,** announces the issuance of a complete new 40-page catalog on its Spiral-Bevel Speed Reducers. This modern book contains design features, specifying and ordering information, selection tables, service factors and arrangements, dimensions, horsepower ratings, parts lists, etc. In fact, it is practically a treatise on the subject. A copy of this catalog (SB-517) will be sent upon request on your business letterhead. **(14)**

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**SEPTEMBER, 1957**

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | | | | | | | | | | | |

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# More Information, Please

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**TRANSALL BELT CONVEYORS**—perfectors of the prelubricated idler—are the topic of Bulletin No. 915 of *Transall, Incorporated.* Check points and dimensions are given, and other products are listed. **(15)**

**WIRE ROPE AND SLING OPERATIONS,** as used in typical applications, are described in Ropeology 5781, a publication of the *Macwhyte Company.* These range from handling a 10-ton machine bed to new aircraft servicing. **(16)**

**PILLOW BLOCKS,** most recent addition to *Dodge Manufacturing Corporation's* line of mounted bearings, are covered in Spher-Aline Pillow Blocks, an 8-page bulletin. Tabulated data on dimensions, shaft sizes, weights, and radial load ratings are included. Explains how the new Micro-Mount insures maximum bearing life by providing for fast and accurate seating of bearings on shafts. **(17)**

**CRAWLER GEARS FOR THE WORLD'S LARGEST SHOVEL** is one of a series of bulletins and catalogs issued by the *Farrell-Cheek Steel Company.* This folder features the nickel alloy gears made by Farrell-Cheek for the Marion "Mountaineer" shovel. **(18)**

**SAFETY ENGINEERED** equipment developed by the *Wire Rope Corporation of America* is featured in a kit containing four fliers—MLS (Miracle Lock Safety Splice), Wireco Boom Pendant Assemblies, Wireco Exclusive Mazzella Slings, and Wireco Steel Grip Sling. Theme in each is safe operation. **(19)**

**DUST CONTROL AND ROAD STABILIZATION WITH ORZAN AL-50** is described in a folder distributed by the *Crown Zellerback Corporation.* Applications of this product—sprayed on dirt roads to eliminate dust and stabilize the surface—are listed and its action is described. **(20)**

**HOW TO CONQUER WEAR WITH ORO-LOK LINER** is the theme of a bulletin recently published by the *Kensington Steel Company.* Presents the features of this new cement grinding mill liner and lists special advantages. **(21)**

**TRANSMATIC DRIVE** a fully automatic six-forward-speed transmission for medium through extra-heavy-duty trucks is described in a flier of the *Ford Division of Ford Motor Company.* Specific advantages are presented, and complete data is given on performance. **(22)**

**LATEST IMPROVED MODELS** in equipment for the mining, process, and milling industries and allied fields are fully described in an 8-page bulletin (No. G3-B60) issued by the *Denver Equipment Company.* A partial list of equipment: agitators, ball-rod mills, grinding systems, jaw crushers, dryers, drum filters, flotation, diaphragm pumps, vibrating screens, and thickeners. **(23)**

**THREE NEW DATA SHEETS—GB 804LE, GB 811, and 804D—** have been distributed by the *Hauck Manufacturing Company.* No. 811 covers blast type pilots for ignition of industrial gas or oil burners; the other two deal with "Retain-a-Flame" gas burner nozzles, screwed and flanged types. **(24)**

**MATERIALS HANDLING EQUIPMENT and FORK LIFT TRUCK ATTACHMENTS** are described in two new bulletins released by the *Allis-Chalmers Manufacturing Company.* The first describes design, engineering, construction, and operating features of A-C fork lift trucks, towing tractors, and Chore Boy Platform Trucks. The second presents the new line of clamping attachments available for A-C lift trucks. Fully illustrated. **(25)**

**NORBLO** automatic Bag-Type Dust Arrestors are presented in Bulletin 164-5 and its supplement. Dimensions and capacities are given and special advantages are cited in this publication of the *Northern Blower Company.* **(26)**

**ELECTRIC EXTERNAL VIBRATORS,** made in Germany, are featured in a flier issued by the *Hydrotile Machinery Company,* distributors in the United States. Two models are pictured and fully described, and specifications are given. **(27)**

**SEPTEMBER, 1957**

**Please send more information on circled items described in this issue.**

| | | | | | | | | | | | | | | | | | | | |
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| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | | | | | | | | | | | |

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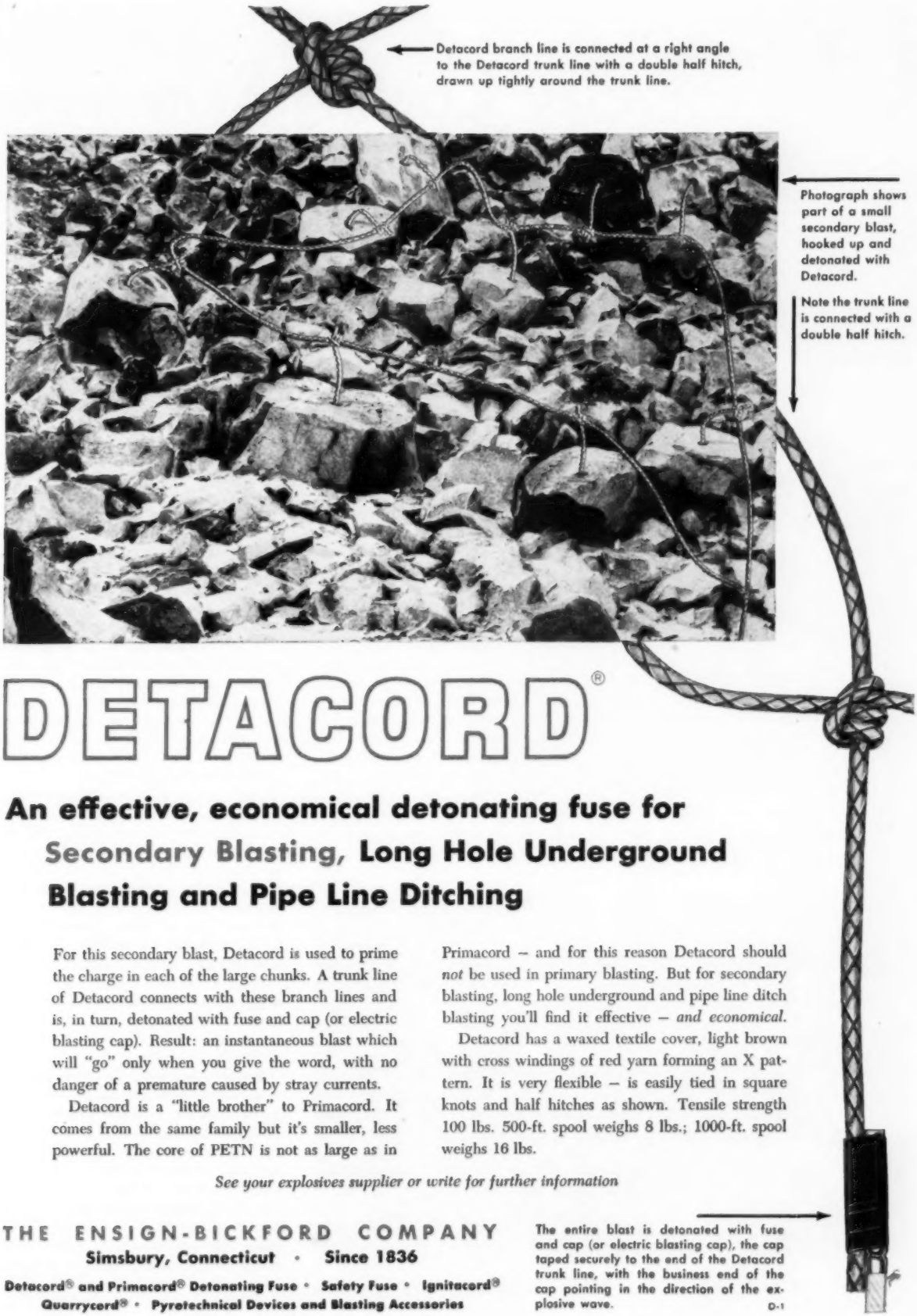


Detacord branch line is connected at a right angle to the Detacord trunk line with a double half hitch, drawn up tightly around the trunk line.

Photograph shows part of a small secondary blast, hooked up and detonated with Detacord.

Note the trunk line is connected with a double half hitch.

The entire blast is detonated with fuse and cap (or electric blasting cap), the cap taped securely to the end of the Detacord trunk line, with the business end of the cap pointing in the direction of the explosive wave.

# DETACORD®

## An effective, economical detonating fuse for Secondary Blasting, Long Hole Underground Blasting and Pipe Line Ditching

For this secondary blast, Detacord is used to prime the charge in each of the large chunks. A trunk line of Detacord connects with these branch lines and is, in turn, detonated with fuse and cap (or electric blasting cap). Result: an instantaneous blast which will "go" only when you give the word, with no danger of a premature caused by stray currents.

Detacord is a "little brother" to Primacord. It comes from the same family but it's smaller, less powerful. The core of PETN is not as large as in Primacord – and for this reason Detacord should *not* be used in primary blasting. But for secondary blasting, long hole underground and pipe line ditch blasting you'll find it effective – *and economical.*

Detacord has a waxed textile cover, light brown with cross windings of red yarn forming an X pattern. It is very flexible – is easily tied in square knots and half hitches as shown. Tensile strength 100 lbs. 500-ft. spool weighs 8 lbs.; 1000-ft. spool weighs 16 lbs.

*See your explosives supplier or write for further information*

**THE ENSIGN-BICKFORD COMPANY**

**Simsbury, Connecticut • Since 1836**

**Detacord® and Primacord® Detonating Fuse • Safety Fuse • Ignitacord® Quarrycord® • Pyrotechnical Devices and Blasting Accessories**

D-1

# Clay Coating Removed From Sand by Attrition At Nevada Plant

By HARRY F. UTLEY

FOR YEARS, the building industry in Reno, Nev., has been dependent for its concrete aggregates, on the Truckee River, which flows through the city. Coarse material from the river is of good quality and requires only conventional processing. The sand, however, is a low-grade quality and can approach the specification level only if it is painstakingly processed to eliminate various unsound fractions.

Ready Mixed Concrete Company of Reno has operated a batch plant on the river bank for about ten years. Some time ago the management carried out an exploratory program, seeking to discover in the surrounding hills a more satisfactory source of aggregate supply. East of the town of Sparks, about 7 miles from Reno and lying in the foothills of the Virginia Range, officials of the company discovered what they were seeking, acquired title to an 80-acre deposit, and began the erection of a plant.

The Sparks facility, operated as the Vista Rock Company, went into production in May, 1956. Capacity is about 140 t.p.h. of high-grade aggregates. Here the sand is of excellent quality, although the grains are clay-coated to such an extent that all of it must be put through a 4-cell attrition machine to clean it up completely before it is finally stockpiled.

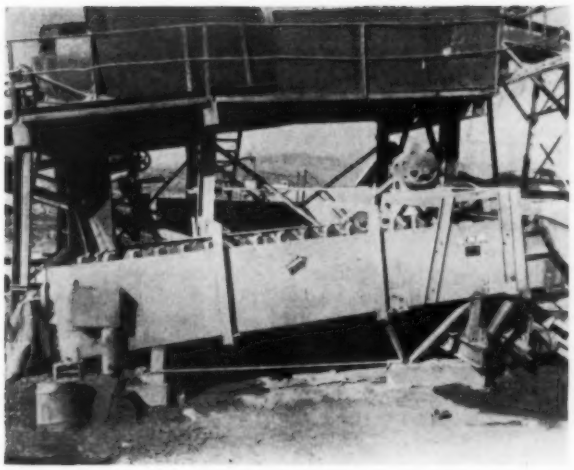
Excavation at the pit is done by a Northwest ¾-cu. yd. diesel shovel, and the material is trucked a short distance to the plant hopper. Oversize is reduced to size by a 24- by 42-in. Diamond jaw crusher and a 3-ft. Symons cone crusher in closed circuit with a 4- by 12-ft. Bodinson double-deck dry scalping screen, before it is carried by belt conveyor to the washing-and-sizing tower.

A 2,500-c.f.m. exhaust fan and cyclone operates at option in conjunction with the scalping screen for the removal of excess fine clay and silt in the form of dust, especially at such times when the plant output is being stockpiled as unwashed crusher-run-base product.

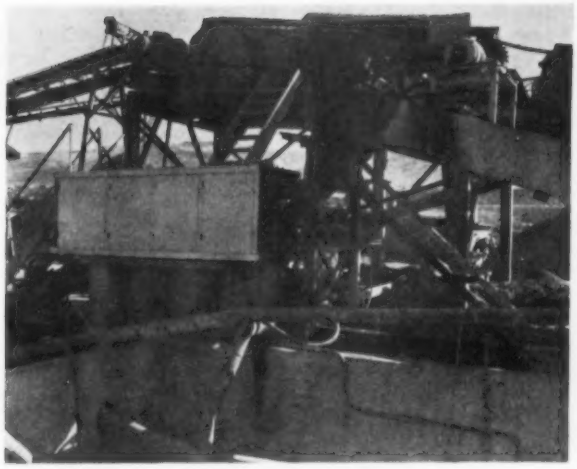
The first pass in the washing department is through a 5- by 24-ft. revolving scrubber. Three blends of gravel are washed, sized, and stacked in stockpiles by conveyors. These finished gravels are normally in the range of 1½- to ⅞-in.; ⅞- to ⅜-in.; and ⅜- to ¼-in. Sizing equipment following the scrubber includes a 4- by 14-ft. Diamond 3-deck screen and a 4- by 12-ft. Cedarapids double-deck unit. Both screens are fitted with washing sprays to clean the gravel and wash the sand along for processing.

Before the sand is subjected to a thorough scouring in the Wemco 4-cell attrition machine, it is given primary treatment by a 20-ft. Eagle Iron Works double log-washer or an Eagle Iron Works twin-screw classifier. Cells of the attrition machine are octagonal in shape, each having a capacity of 8½ cu. ft. of pulp. The grains scour against each other while rubber-covered agitator blades revolve within the cells. Each cell rotor is separately driven by

A general view of the Vista Rock operations. The plant hopper and primary scalping screen are visible in the distance.



This log-washer does the preliminary clean-up work on the clay-coated sand.

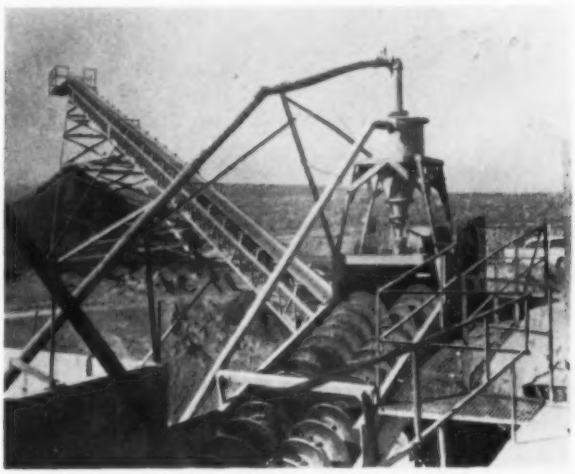


In this rear view of the attrition machine, the sump is in the foreground, and the revolving scrubber above.

its own motor. There is provision for the addition of four more cells should the plant's production capacity be increased in the future. The machine handles sand at about 60 t.p.h. at capacity, discharging to a final screw classifier-dewaterer.

Overflow from the classifier is pumped by a 4-in. Lightning rubber-lined pump to a wet cyclone mounted above the discharge end of the classifier to extract any remaining amounts of fine, clean sand. All dirty water, silt, and other impurities are ultimately flumed into a concrete sump. A Krogh silt pump transfers it *via* pipeline to the settling ponds. The finished sand is radially stockpiled for drainage.

About 80 percent of the output is used to batch ready-mix concrete at the company's Reno batch plant. A fleet of three Mack-Utility semi-trailer units is employed in this service, each capable of transporting 23 tons. These semis are loaded at the stockpiles by a Scoopmobile.



The final sand-classifying screws, with the wet cyclone mounted above the discharge end. In the background is the radial sand-stockpiling conveyor.

Washwater requirements are obtained from a 340-ft. drilled well at 1,100 g.p.m.

F. R. Smith, president and general manager, is a former mayor of Reno. He has been engaged in the aggregates, concrete, and construction business in Reno for many years. R. L. Miller is assistant manager.

## New Southern Cement Unit Boosts Lime, Cement Output

Southern Cement Company, a division of American-Marietta Company, has begun operations at another major cement production unit in Roberta, Ala., and has also completed facilities there, increasing the output of chemical lime by 60 percent. Roberta is 40 miles south of Birmingham.

Installation of a 420-ft. dry-process rotary kiln, together with related equipment, increases Southern's annual cement capacity by 1,500,000 bbl. The increase in chemical grade lime output results from additional equipment installed to step up the stone quarrying and crushing rate.

Founded in 1901, Southern's original cement plant is at North Birmingham, and headquarters are in the Protective Life Building in Birmingham.

At ceremonies marking the opening of the new unit visiting industrial leaders were welcomed by W. J. Cabaniss, president, M. A. Rikard, vice-president (in charge of the expansion), and C. H. Ellison Jr., vice-president.

Although Southern originally purchased raw materials for cement production, Mr. Cabaniss and his associates have developed a program during the last ten years to make the company an integrated producer.

Southern now owns about 1,000 acres of proved limestone reserve, which will be adequate for 70 years of operation.

## 1956 A.S.T.M. Proceedings Summarizes Year's Work

The 1956 edition of the A.S.T.M. Proceedings has been published. The 1510-page volume records the accomplishments of the American Society for Testing Materials for the year 1956 and includes technical reports and papers with discussions. A summary of the 59th annual meeting held June, 1956, noting the title and author of each paper presented is included.

Copies of this book may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia, Pa., at $12 each.

## June Contracts Rise 10% Over June, 1956, Total—Six-Month Volume Up 5%

June contracts for future construction in the United States totalled $3,243,486,000, an increase of 10 percent over the same month last year, according to the F. W. Dodge Corporation. Total construction contracts for the first half of 1957 amounted to $16,958,005,000, up 5 percent from last year.

Commenting on the total contract figures for the first six months of this year, Thomas S. Holden, Dodge vice-chairman said, "The record to date leaves little room for doubt that the dollar volume of construction activity for the year 1957, as a whole, will exceed last year's all-time high."

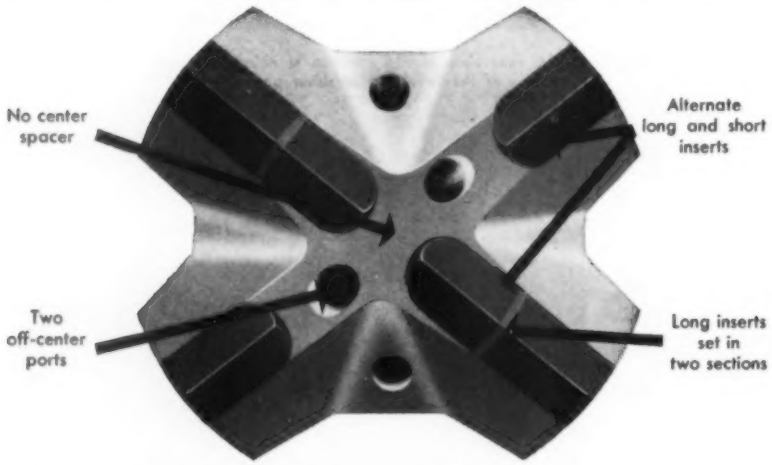
Contracts for non-residential buildings were valued at $1,186,448,000 in June, 16 percent above the 1956 level. Nearly all types of non-residential buildings shared in the increase; the largest gains were registered by hospital and manufacturing buildings. For the first six months of this year, non-residential building contracts totalled $5,970,747,000, 5 perecnt higher than the corresponding period of 1956.

June contracts for residential buildings amounted to $1,155,049,000, down 4 percent from a year ago. The entire decline was accounted for by a decrease in contracts for one- and two-family houses. Residential building contracts for the first half of 1957 were valued at $6,483,314,000, 5 percent below the first half of 1956.

The number of housing units contracted for in June totalled 86,549, a drop of 12 percent, compared to June, 1956. The number of housing units for the first half of 1957 amounted to 499,490, a decline of 11 percent from the comparable 1956 period.

The sharper decline in unit volume than in dollar value in the residential category can be accounted for by the trend toward larger and more costly homes.

The dollar value of heavy engineering contracts in June was $901,989,000, an increase of 25 percent over June, 1956. A substantial gain in the public works category more than offset a decline in the utilities category. Heavy engineering contracts for the first half of 1957 amounted to $4,503,944,000, a rise of 21 percent over the corresponding period last year.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Each of these Kennametal features can mean savings to you:

- End milling the bit body to receive the carbide inserts eliminates the need for a center spacer
- Two short inserts permit two water ports to be located off-center where they will not clog.
- Setting the long inserts in two sections makes them stronger and lengthens bit life.
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Sizes from 2½" to 5" are available in the "X" design. Call your Kennametal Representative or write KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

INDUSTRY AND KENNAMETAL ...Partners in Progress


## Albany Limerock

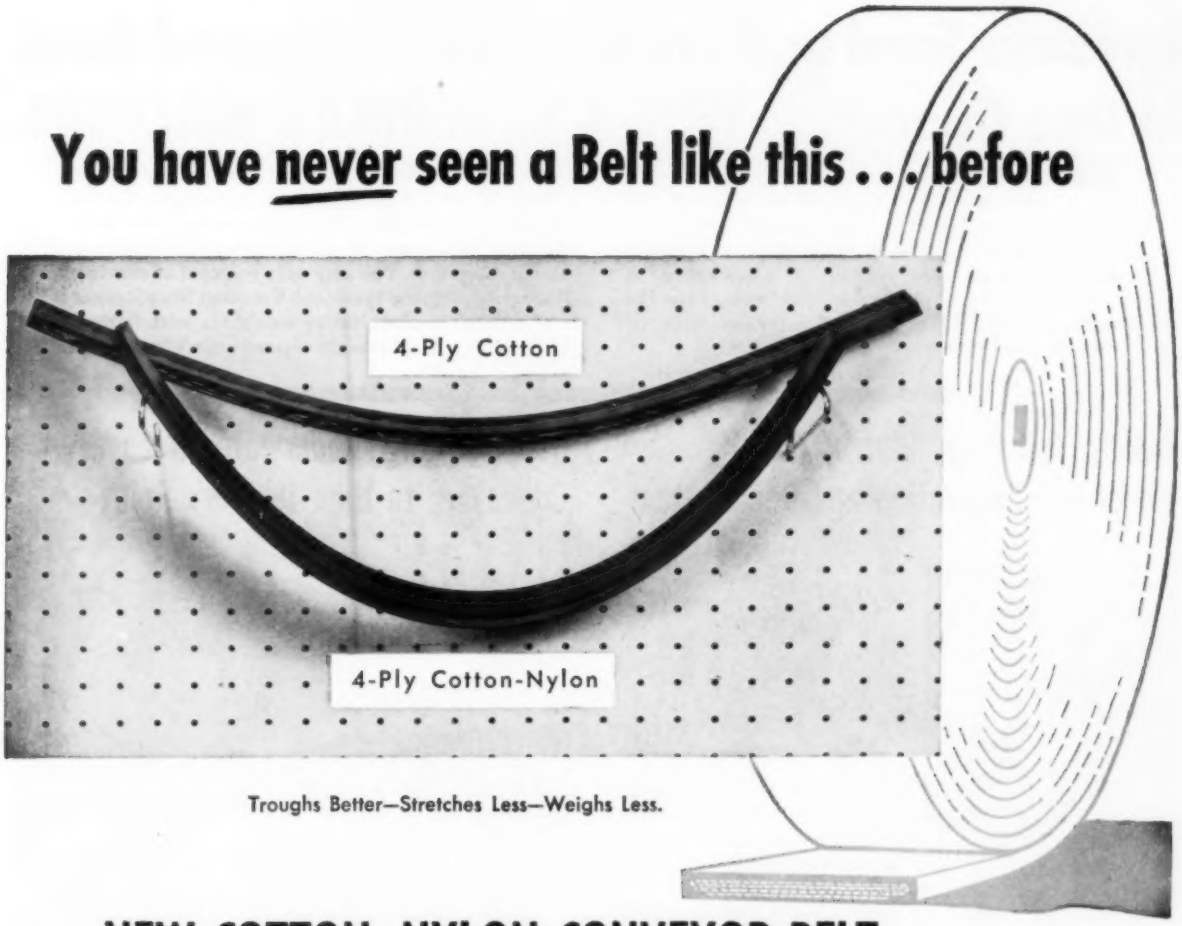
(*From page* 138)

terial, is clean, the separated fines are added to the crushed material from the Impact Master, and all the material goes to a hopper with a 30-in. heavy-duty apron feeder to the screening plant conveyor. If the material received by the Wobbler feeder is dirty, a 24-in. reversible reject-conveyor carries it off to the side for stockpiling.

The Universal Wobbler feeder operates on a 15-hp. high-torque electric motor at 1,800 r.p.m. The Universal Impact Master operates on a 200-hp. motor at 1,200 r.p.m. A Lovejoy three-to-one Variable-Speed drive on the feeder enables the oprator to pace the feed flow of material into the Impact Master with the rate of crushing speed.

Crushed material reaches the screening tower by a 30-in. conveyor and passes over a 5- by 14-ft. speed-adjustable, three-deck Simplicity screen with self-feeding oilers. The material passing the screen is stored in three 23-cu. yd. bins. Screen oversize is returned on an 18-in. horizontal conveyor to the Impact Master for further reduction. Only trucks are being loaded now, but future plans call for a railroad spur.

# You have never seen a Belt like this . . . before




Troughs Better—Stretches Less—Weighs Less.

## NEW COTTON-NYLON CONVEYOR BELT

● Pictured above is a sample of a 4-ply cotton conveyor belt and a sample of the **new 4-ply cotton-nylon belt.** Both belts are designed to carry the same load.

Can you picture how a belt which will trough like this one would **improve your operation . . . plus the fact that it is lighter, has less stretch and will operate over smaller pulleys.**

The explanation is simple. Republic uses a fabric with cotton running **lengthwise** and nylon running **crosswise.** Nylon yarn of the same strength as cotton is thinner and more elastic. The nylon, running crosswise, will naturally make the belt trough better. In belts of equal plies and strength, the cotton-nylon belt will weigh approximately 25% less than the cotton duck carcass.

**This fine new belt has a folded edge with rubber friction and covers of Republic's Super Excelo or Record Maker grades.**

The original idea for the belt was to replace conventional cotton fabric belts where the bulk of the load did not have sufficient weight to trough a heavy belt. But, the flexibility and other qualities are extending the belt's use to many diversified applications.

Probably you have an application where cotton-nylon will be the most efficient for you. Take a look at your belting . . . **then write us for recommendations on how this cotton-nylon belt might do a better job for you.**

**REPUBLIC RUBBER DIVISION**

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

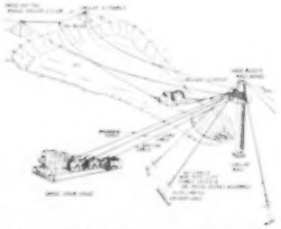
# Increase Sand and Gravel Profits—Dig *and Haul* In One Operation With A SAUERMAN MACHINE

**Digging and hauling are reduced to one continuous operation by using either a Sauerman DragScraper or Slackline Cableway. By combining the two basic steps of material flow, equipment and labor costs are halved—or even more. A single machine, controlled by one man, does the same job as the multiple equipment required by other methods.**

**Profitable handling is further assured by a low maintenance cost of 1½ cents per cu. yd. for an average size installation. Larger machines drop this cost still lower. Important, too, is the money saved on power. You pay only the cost of moving the actual digging tool—the Crescent DragScraper or Slackline bucket. Heavy machines with limited handling-to-dead weight capacity are eliminated.**

## General Handling, Wet or Dry— Pit or Hill Excavation and Reclamation

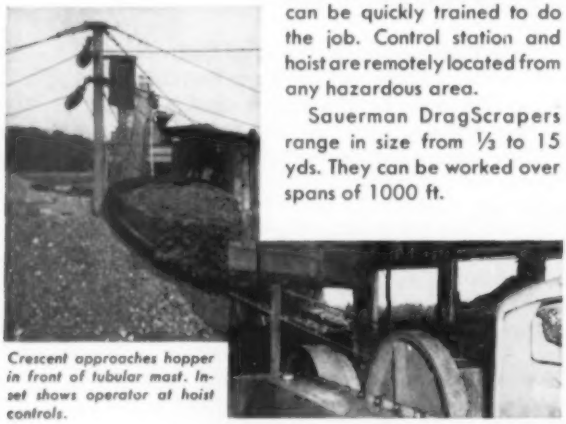
*3-yd. DragScraper digs and hauls sand and gravel from pit to plant hopper over a distance of 400 ft.*



A DragScraper is recommended for these and similar jobs. This machine handles the toughest digging and operates on a hillside or underwater with as much facility as dry level ground. It hauls directly to hopper, crusher or storage pile.

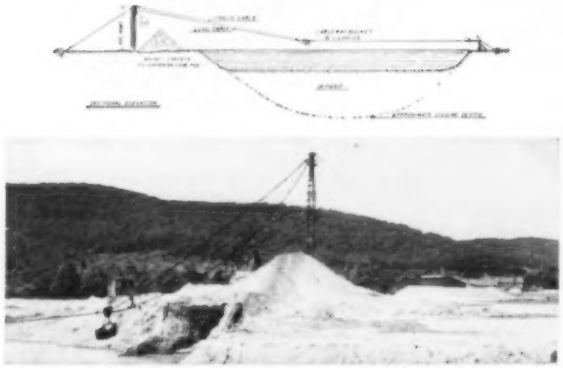
Operation is simple and safe. An inexperienced man can be quickly trained to do the job. Control station and hoist are remotely located from any hazardous area.

Sauerman DragScrapers range in size from ⅓ to 15 yds. They can be worked over spans of 1000 ft.



*Crescent approaches hopper in front of tubular mast. Inset shows operator at hoist controls.*

## Deep Digging, Underwater Recovery— Conveying to High Delivery Point



*This 1½-yd. Slackline Cableway is digging in 70 ft. of water and conveying to stockpile on an average haul of 600 ft.*

When deep digging is required—or anticipated in the future—a Sauerman Slackline Cableway is the best machine. This powerful excavator can dig 100 ft. or more below water, lift its load and deliver to a high pile up to 1000 ft. away. This surge pile can be held in readiness for plant needs.

The bucket inhauls at high speed and dumps automatically. The dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point completing the fast operating cycle.

Sauerman Slackline Cableways range in size from ⅓ to 3½ cu. yds. Now available with torque convertor power, the Slackline is increasing its production over 25%.

*Bucket automatically discharges onto a 60-ft. high cone pile. Mast in foreground rises 90 ft.*

**The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Why not consult Sauerman engineers about your plant? Their recommendations will be based on almost fifty years of sand and gravel excavating machinery experience. Ask for Catalog A (DragScrapers) and C (Slackline Cableways).**

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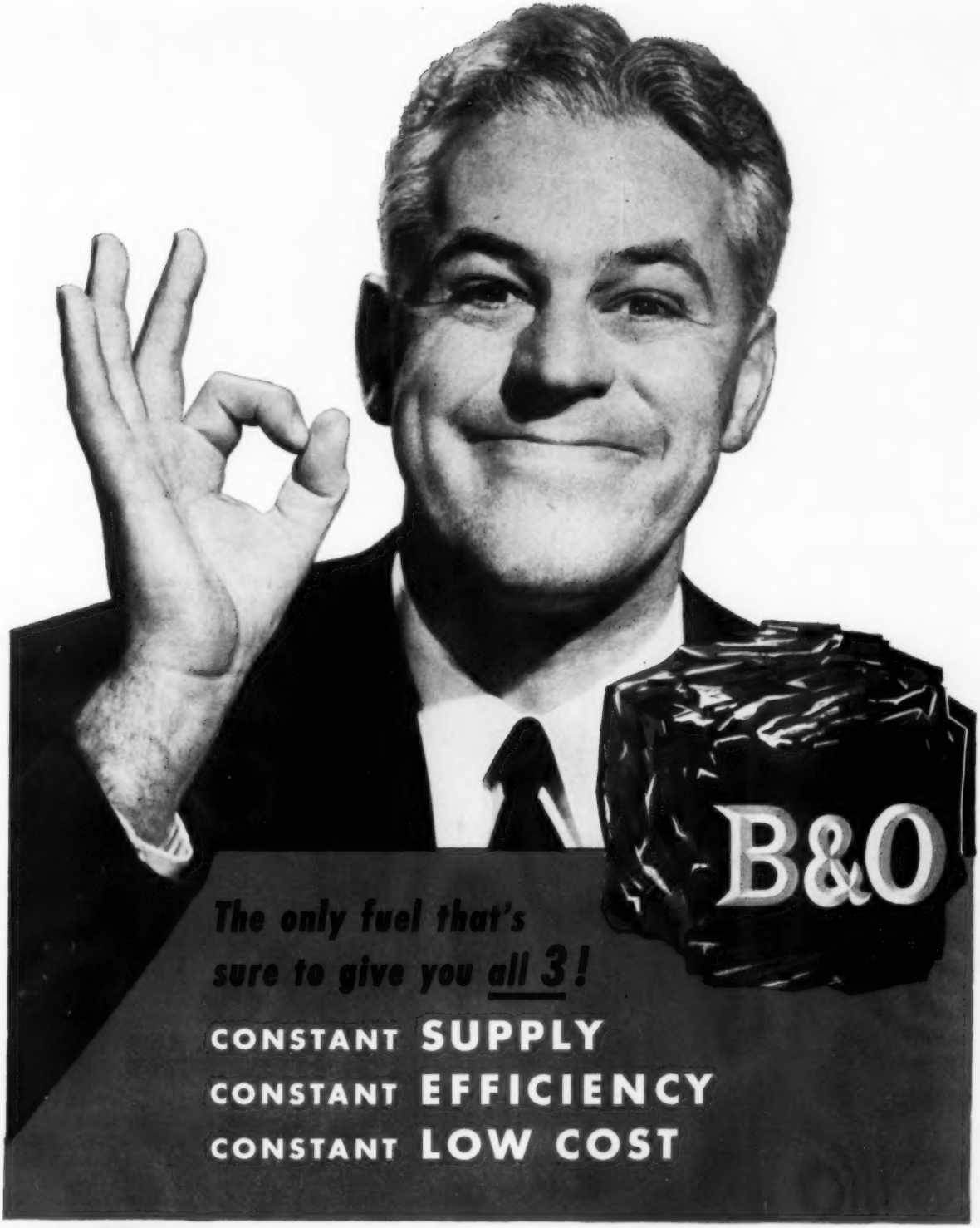
CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

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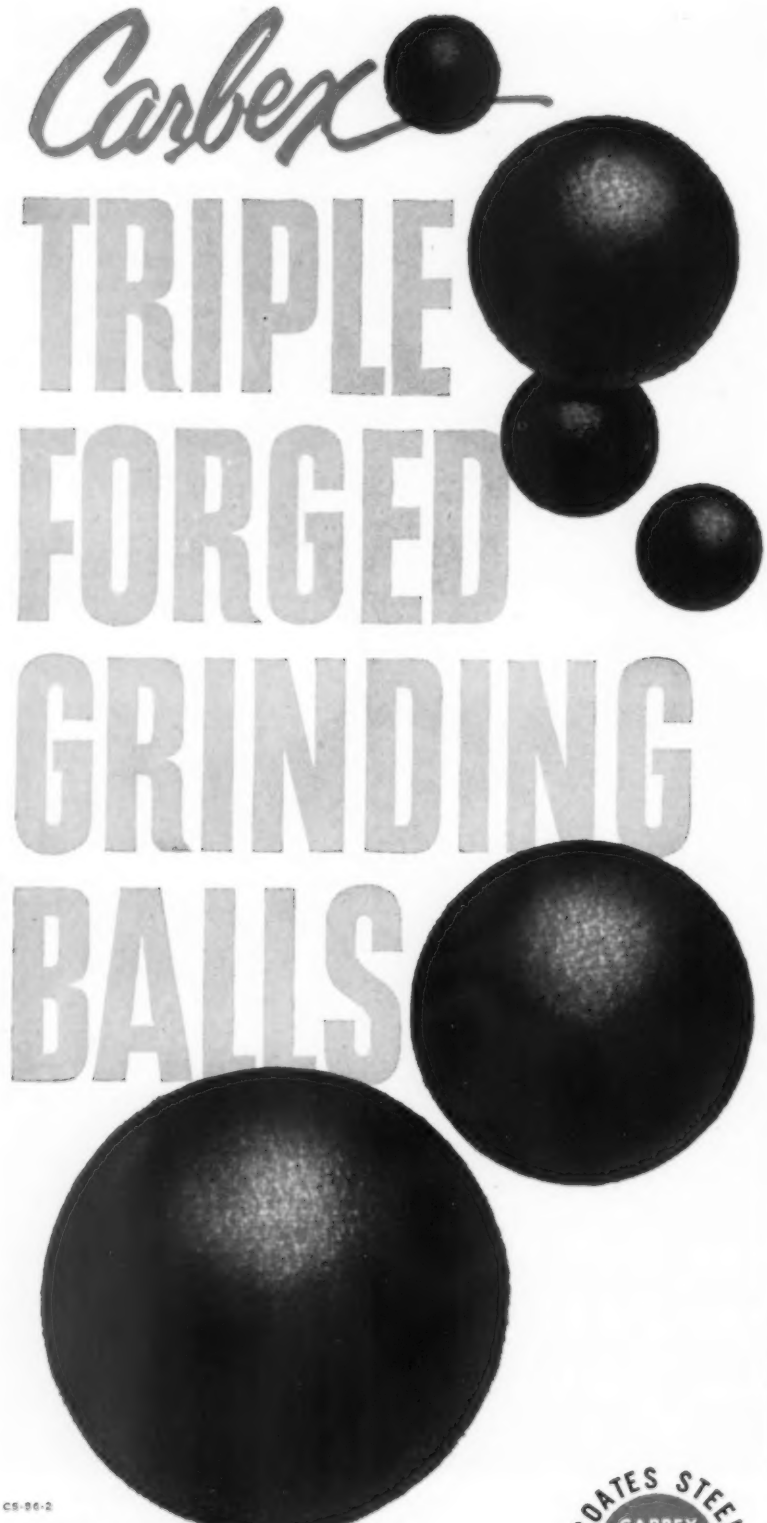


CS-86-2

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COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

### Officials Announce Merger Of Johns-Manville, Bestwall

Johns-Manville Corporation officials have announced plans to acquire Bestwall Gypsum Company, Ardmore, Pa., a move which put J-M in the gypsum field for the first time. A preliminary merger agreement was reached between the two firms.

The merger would be accomplished by an exchange of stock—1¼ shares of Johns-Manville for one of Bestwall. Implementation of the plans will be started as soon as stockholders of both firms have approved the transaction.

Bestwall has 1,500,000 shares authorized, of which 715,145 are outstanding. Johns-Manville has 25,000,000 authorized shares, of which 7,151,424 are outstanding.

Main product of J-M is asbestos, while Bestwall produces plaster, plaster lath, wallboard, and a line of industrial gypsum products. The firm has gypsum deposits in Nova Scotia.

### Asphalt Pavement Tests Slated by Air Force, C. of E.

Representative F. E. Hebert (D., La.) recently released the text of letters received from the Department of the Air Force and the Corps of Engineers, U. S. Army, in which both agreed to conduct tests on a design of asphalt pavement which would support a B-52 bomber with a 250,000-lb. weight load. Mr. Hebert is chairman of the subcommittee for special investigations of the House Armed Services Committee.

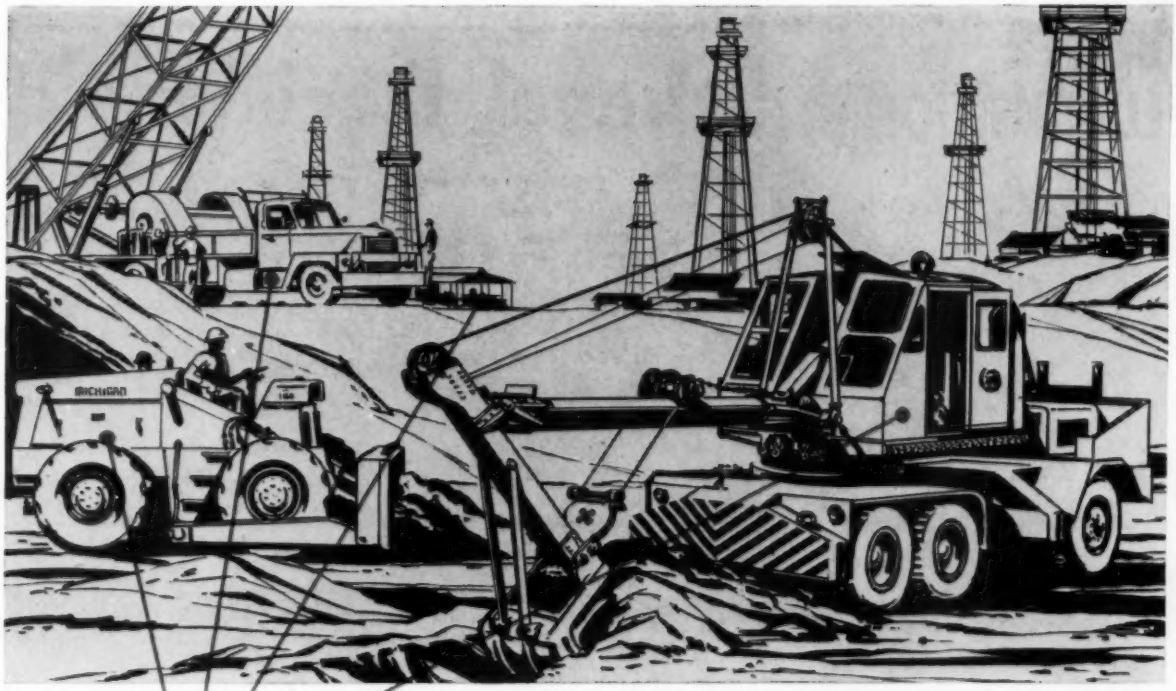
These tests are to be conducted at Columbus, Miss.; and pending the completion of the tests and publication of results, the subcommittee will hold its hearings in abeyance.

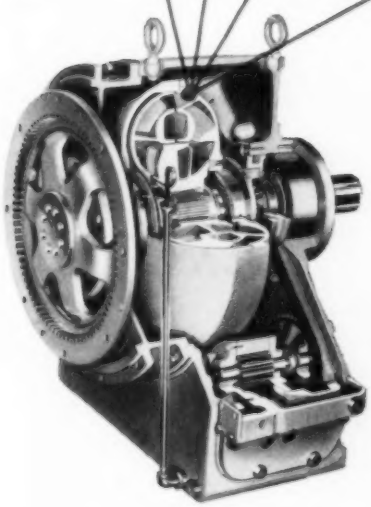
This release followed a report submitted by the Corps of Engineers to the committee after a joint meeting with the Air Force in accordance with instructions from the chairman at the conclusion of the public hearings.

### 1,200,000 Additional Shares Created by Inland Cement

Shareholders of Inland Cement Company, Ltd., Edmonton, Atla., have approved an increase of the firm's authorized capital by creating an additional 1,200,000 participating preferred shares.

This increase made available the 291,250 preferred shares required in connection with the purchase of the assets of the Saskatchewan Cement Corporation, Ltd., of Regina and additional shares necessary for further financing.





## It can be done! – –

## That engine will DO MORE, LAST LONGER with a

# CLARK Torque Converter

You are sure of top engine performance and minimum wear when you use a Clark Torque Converter. Your engine may be operated all the time at its most efficient speed, with power output adjusted to the job's torque demand. And the smooth, steady flow of shockless power eliminates shock loads—reduces strain and wear on all working parts, in engine *and* power train.

These features are dependable working proof of Clark excellence:

- **True Hydra-Foil Blade**—an exclusive design of blade contour, maximum efficiency in torque build-up
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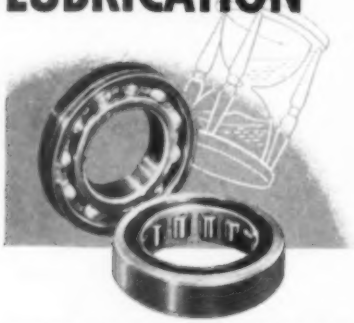

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# Legal Decisions


**By LEO T. PARKER**
Attorney at Law
Cincinnati, Ohio


## Compensation vs Damages

At a convention of owners and officials of firms dealing in nonmetallic products the following important legal question was presented to me: "Are there any important differences between the amounts payable to injured employees under the State Workmen's Compensation Act and damages usually awarded by the jury?"

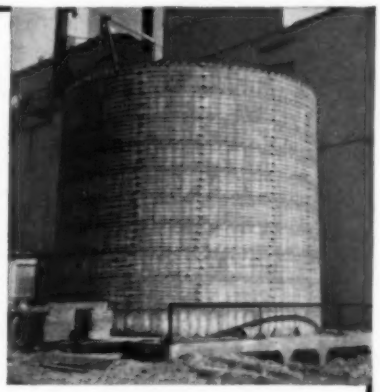
The importance of this legal question, and its answer, caused the writer to review numerous higher court decisions involving damage awards by juries and also compensation allowable to injured employees in various states under the State Workmen's Compensation Act. The results are interesting and should be known by every employer.

First, I shall review compensation allowances in the average state. Let us assume that in this average state an employee earns $100 per week when he sustains an injury. The amounts of compensation payable to the injured employee are as follows: loss of thumb, $1,932; loss of finger, $644; loss of hand, $4,000; loss of arm, $7,200; lass of great toe, $920; loss of a foot, $4,800; loss of leg; $6,400; loss of sight of one eye, $4,000; loss of ear, $800.

If the employee is permanently and totally disabled, as by the loss of both arms, or both feet, or both eyes, he will be paid the maximum weekly compensation of $32.20 and the minimum of $10 per week (depending upon earned wages) during his lifetime or until his death.

If the employee dies within two years after the injury, his dependents will receive not more than $32.20 per week or $9,000. In other words, the employee's dependents, as a wife and children, can receive no more


## Neff & Fry Bin Being Erected for Handling Silica Sand



When photographed, this Neff & Fry Super-Concrete Stave Bin was being erected for the Ottawa Silica Co., Ottawa, Ill. It is the first of two 28′ x 40′ bins which are now completed and in use. Silica sand is supplied principally to glass manufacturers, foundries, and concrete producers.

Through our experience in building thousands of bins, we have mastered the techniques of handling and storing virtually all kinds of flowable bulk materials. This knowledge is at your service upon request. You are invited to communicate with us.

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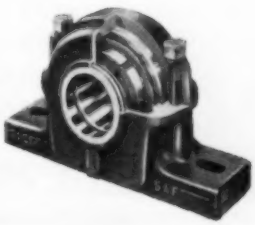


**SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.**

than $9,000 for the death of the employee.

Another important clause in this State Workmen's Compensation Act is that no compensation is payable the first week after an injury is sustained. Furthermore, the law states that no compensation is payable for the first week after the employee is totally disabled unless the employee is totally disabled for at least five weeks.

### Jury Damage Awards Are Higher

For the benefit of readers, I have carefully reviewed awards of damages made by juries in different states during the past six months for injuries to employees and other persons. The results are as follows:

In *Davis v. Boldist,* 295 S. W. (2d) 941, $45,000 damages was awarded to a 29-year-old laborer who had a knee injury.

In *Farmer v. Hooks,* 239 Fed. Rep. (2d) 547, a Federal higher court awarded $114,295 damages to an ordinary workman for injuries which would permanently prevent him from carrying on his past heavy work.

In *Thompson v. Robbins,* 297 S. W. (2d) 247, a jury awarded $75,000 damages to an employee for permanent injuries which would enable him to do only ordinary work, but which injury would prevent him from doing the same kind of work he had been doing previously and for which he was paid $6,000 per year.

In *Butler v. General,* 143 F. Supp. 461, the lower court awarded $200,000 damages to an employee whose leg was amputated. The higher court reduced the damage allowance to $160,000.

In *Revera v. T and S,* 299 Pac. (2d) 1090, the lower court awarded $68,500 damages to an ordinary laborer in view of a permanent injury to his hand. The higher court approved this damage allowance.

In *Prim v. Continental,* 143 F. Supp. 123, the lower court awarded $72,500 damages to a 44-year-old injured truck driver. The higher court approved the verdict in view of the fact that the injuries would prevent the employee from being employed in the future as a truck driver.

In *Murray v. McLean,* 159 N.Y.S. (2d) 440, $15,000 damages was awarded an employee for laceration of his leg and herniation of a disc in his back.

In *Turner Company v. Haulihan,* 240 Fed. Rep. (2d) 435, $150,000 damages was awarded to a 39-year-old employee who sustained a compound fracture of one leg and who spent 15 months in a hospital. His leg was permanently deformed, and he could not engage in the same employment as he had followed prior to his injury.

In *Irvin v. U. S.,* 148 Fed. Supp. 25, $42,505 damages was awarded to an employee who sustained serious injuries to his hip socket.

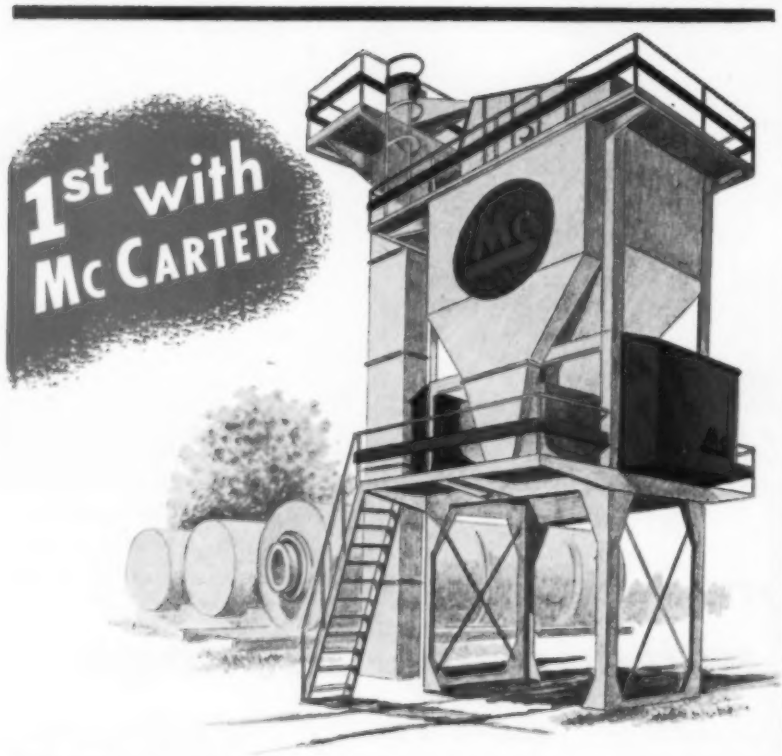
In *Ped v. Wege,* 81 N. W. (2d) 49, a 36-year-old employee was awarded $30,000 damages for a cranial injury with various other fractures.

In *Gross v. Moimar,* 159 N.Y.S. (2d) 774, the higher court awarded $30,000 damages to a person who was struck by an automobile.

In *Work v. Eastern,* 158 N.Y.S. (2d) 636, the higher court held that $40,000 damages for ordinary injuries was excessive and reduced the damage allowance to $30,000.

In *Tant v. Stork,* 158 N.Y.S. (2d) 595, a higher court awarded $80,000 for ordinary injuries to a 56-year-old woman, who had earned $35 per week before the injury.

In *Moe v. Foreman,* 238 Fed. Rep (2d) 817, a higher Federal court allowed $51,500 damages to a 37-year-old assistant foreman, who suffered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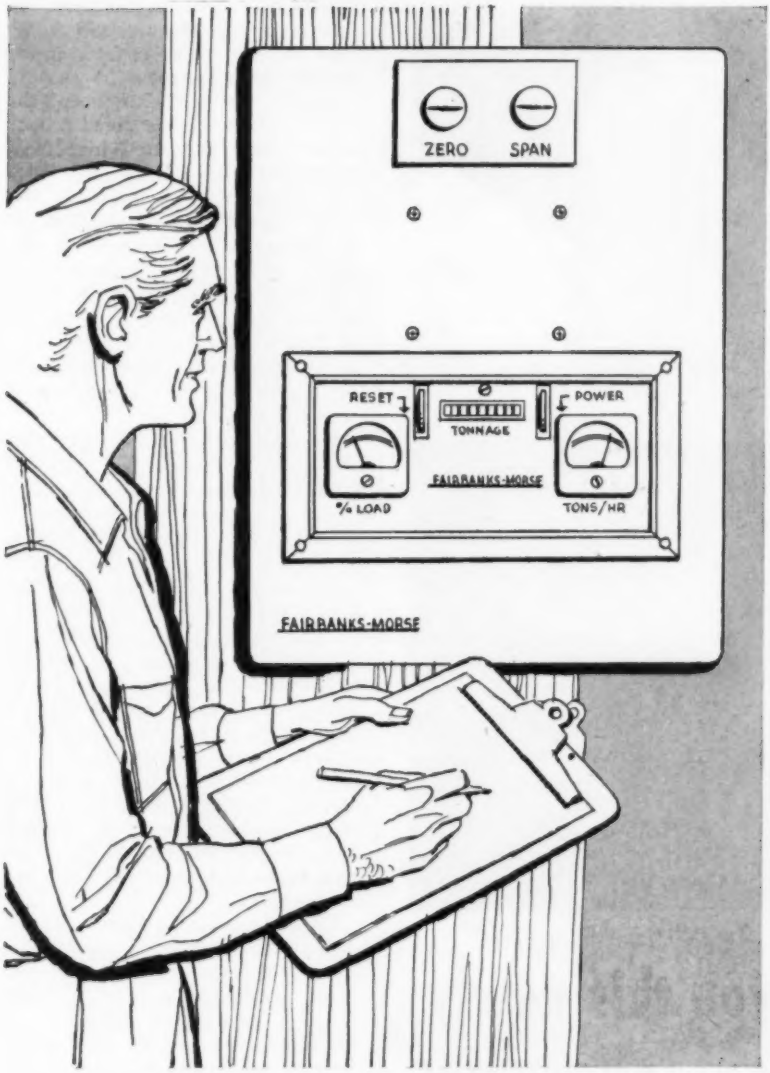


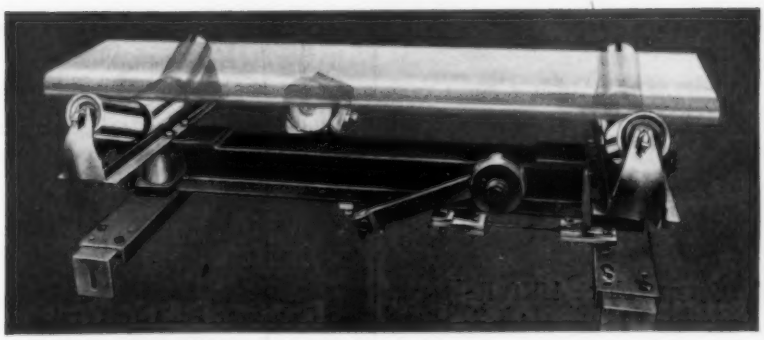

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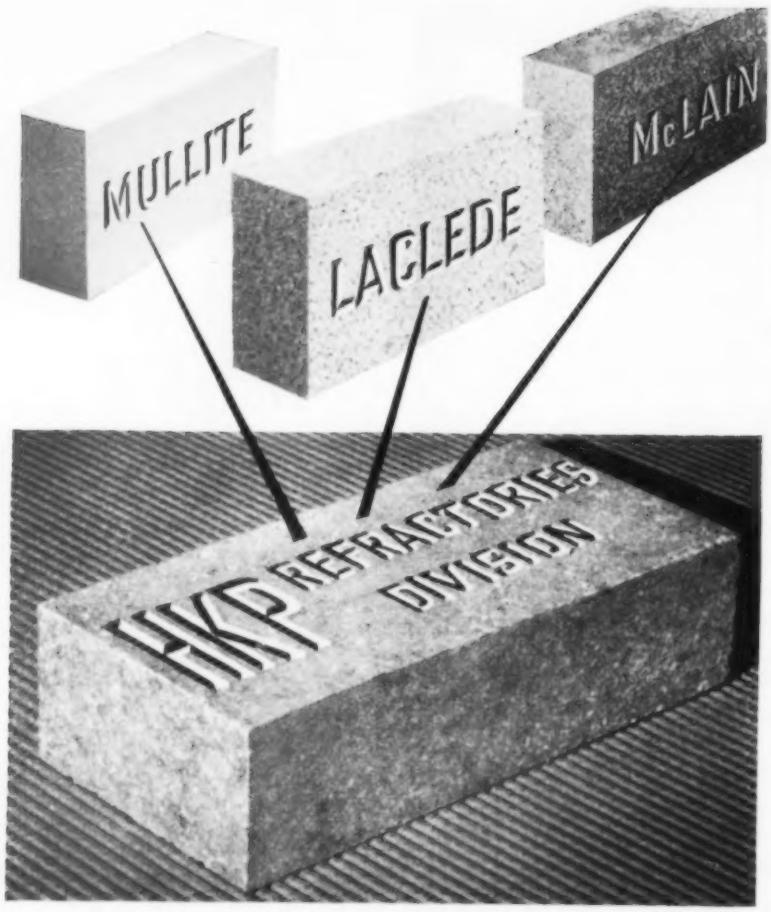


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35 percent permanent disability.

In *Hayter v. Winder,* 295 S. W. (2d) 730, the higher court awarded $20,000 damages to a 56-year-old employee employed to keep the premises clean. He sustained a back injury which pervented him from doing hard work in the future.

In *Hommonds v. Mansfield,* 296 S. W. (2d) 652, a woman suffered an ordinary injury to her leg. She was awarded 17,000 damages.

In *Le Beck v. Jarvis,* 145 F. Supp. 706, the higher Federal court awarded $350,000 damages to a 34-year-old employee who suffered permanent injuries to his legs and extraordinary pain.

In *Dash v. Atchison,* 300 Pac. (2d) 910, a barber was awarded $365,000 damages by the lower court for injuries which made him unable to earn future money in his regular or other lines of duties. The higher court reduced the damage allowance from $365,000 to $290,000 and said:

"The verdict is undoubtedly high. Nevertheless, it is not the function of the reviewing higher court to interfere wth a jury's award of damages unless it is grossly disproportionate to any reasonable limit of compensation.....While it is true that the employee has the privilege of remaining at a veterans' hospital .....he has the right to live at his own home with necessary care and attention....."

For comparison see *Leming v. Oilfields,* 44 Cal. (2d) 343. In this case the higher court approved a verdict of the jury's allowance of $213,460 damages for ordinary injuries to an employee, who was 47 years old.

Quite obviously, in view of the above disclosures, readers will do well to carry state workmen's compensation for their employees, and also carry property insurance for protection against damage suits by patrons and visitors who are injured on the premises. Also, employers must carefully follow the provisions of the State Workmen's Compensation Act, otherwise an injured employee may not be compelled to accept state compensation, but he may sue for damages.

### Employer Fails To Furnish Safe Tools

Generally speaking, if an employer fails to furnish safe tools and equipment to protect an employee from injury, the employee may sue the employer for damages instead of accepting compensation specified by State Workmen's Compensation Act. However, recently a higher court

held that this usual rule of law is not applicable if the employee realized the dangers of working without usual safety tools or equipment.

For example, in *Richardson v. Southern Surety Company,* 139 S. E. 839, it was disclosed that an employee was engaged in loading rock, some of which were too large to be hand loaded. The employee was instructed by his foreman to "blow" these large rocks. While he was doing so, a piece of rock flew and hit him in the eye, seriously injuring the eye.

The employee sued his employer for heavy damages, alleging that the employer was liable in damages because he failed to furnish him with goggles or wire screens for the protection of his eyes, and that such failure was negligence which caused the injury.

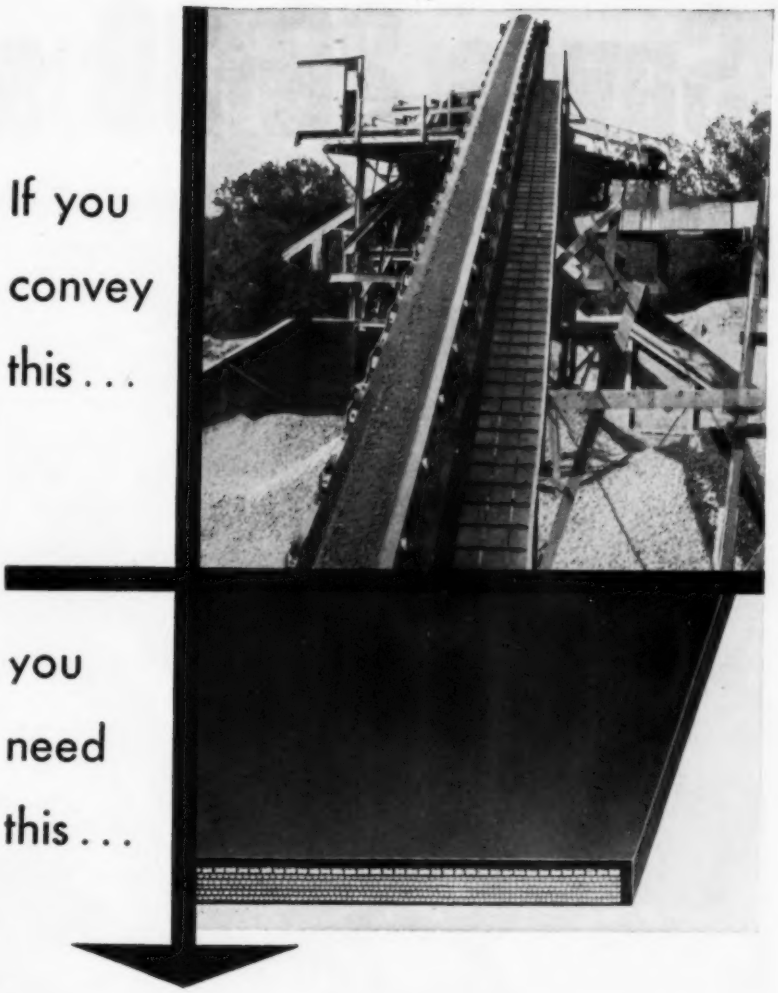
It is interesting to observe that the court held the employer not liable, saying that the danger of working without eye protectors was readily apparent to the employee who, therefore, was contributorily negligent in subjecting himself to the known hazard. The court said:

"Upon the facts of this case, it cannot be held that it was the duty of defendant (employer) to furnish such goggles or wire screens to plaintiff (workman) for his protection while engaged in the work for which he was employed. Plaintiff's (employee) injury, upon all the evidence, was due to an accident, and was not caused by any negligence of the employer."

On the other hand, the higher courts hold that ordinarily the employer is liable in damages for injuries sustained by an employee, as a direct and proximate result of negligence of the employer in supplying the employee with imperfect or defective tools. Moreover, the employer may be liable in damages instead of compensation payments specified by the State Workmen's Compensation Act for a failure to supply the employee with safety devices required and specified by state laws. And, if circumstances are such that the employee did not realize the danger and the employer, or his foreman, should have known of the danger, the employer may be held liable in damage for failure to warn the employee. Otherwise the employee is deemed to be contributorily negligent and barred from suing his employer for damages.

### Compensation Protection Is Limited

A review of the compensation laws of various states discloses that there are many different classifications of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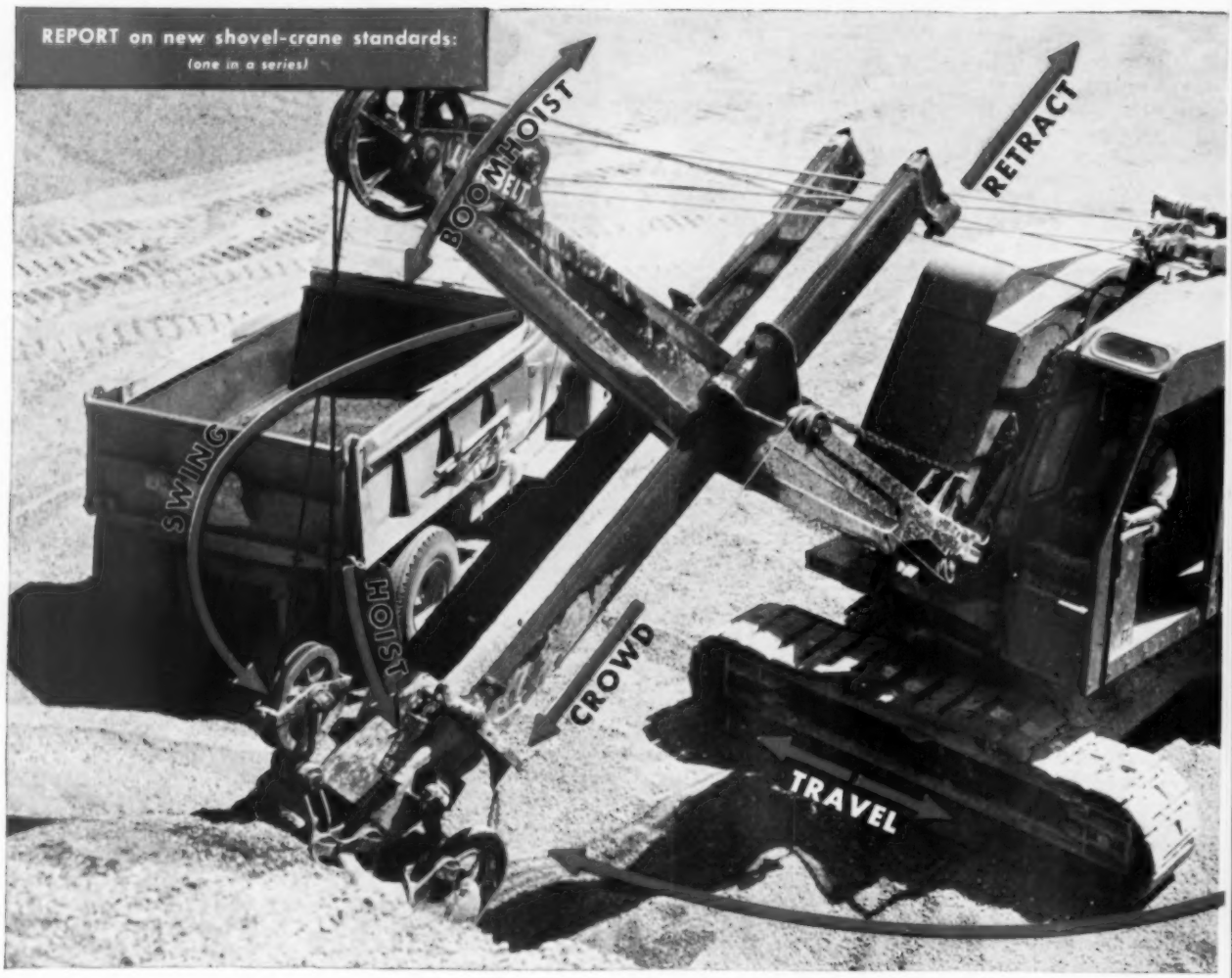


**ALL OPERATIONS ARE COMPLETELY INDEPENDENT—** In addition to eliminating shifting time, *Independent-Travel* allows the operator to swing and hoist the load while travelling. Whether to save time or to jockey the boom around obstacles, the operator can swing the boom while his machine is travelling in either direction. This optional feature can be used with any front-end attachment.

**MORE USABLE HORSEPOWER** — Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.

# each machine move

**Independent-Swing-and-Travel eliminates shifting from swing to travel . . . permits easy moves . . . encourages operators to work machines close to bank where horsepower is used to best advantage.**

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Optional on 11 models, this feature eliminates time losses occurring when operators shift from swing to travel and from travel to swing. With *Independent Travel,* shifting is eliminated and the machine can swing and travel simultaneously.

### Particularly valuable on pit operations

Not only does *Independent Travel* simplify the operator's job, it also conserves his energy . . . helps encourage him to push his Link-Belt Speeder to its exceptionally high limit—all shift long. Furthermore, because the operator knows he can move away from banks in less time than it takes to read this sentence, he's confident, aggressive. He stays in close to the bank, can operate with the attachment at the best digging angle.

Another way *Independent Travel* pays off is that the operator can immediately, effortlessly move his rig along the bank.

### Speed, maneuverability, safety

Owners of machines equipped with *Independent Travel* report that this feature gives them a high percentage of work time spent in actual productive effort. What's more, they say it greatly decreases operator fatigue, keeps end-of-the-shift output at previously impossible high levels. In addition, because all operations are independent of each other (as shown in the illustration at left), the shovel maneuvers more readily in tight quarters and is able to move away from bank cave-ins in a split second.

### Cuts maintenance bills

The design of *Independent Travel* calls for separate power trains, separate clutches, shafts, gears and bearings for swing and travel. As opposed to ordinary machines—which have but one power train to perform both functions and therefore have these components in almost constant use—the Link-Belt Speeder with *Independent Travel* separates the functions . . . divides total wear over two power trains. Life of shafts, clutches, gears and bearings is greatly increased.

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**LESS MAINTENANCE** — Self-compensating hydraulic pistons automatically adjust the clutches . . . eliminate operator's daily clutch adjustments for heat expansion and normal lining wear. With Speed-o-Matic, hydraulic pressure does the job.

*It's time to compare . . . with*

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*Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls*

employment. Each classification takes a special rate of insurance, and the fact that an employer has protection under one classification does not give him protection under other classifications.

For example, in *Wegley v. Snyder*, 62 N. E. (2d) 299, it was shown that an employer named Snyder operated a gasoline filling station, and that he was also the owner and operator of a gravel business located near the filling station. One day an employee was killed while driving Snyder's gravel truck on the filling station lot. Snyder carried industrial insurance, but the policy protected employees who worked in the gravel pit, and did not protect employees in the filling station. Although Snyder believed that all his employees were carried by insurance, the higher courts held that the employee's dependents could not recover compensation under the State Workmen's Compensation Act, but that they could sue the employer for damages.

Hence, in this case, while Snyder was protected under the State Workmen's Compensation Act for injuries to employees in his gravel business, he had no protection on employees injured elsewhere. However, Snyder could have obtained protection under the State Workmen's Compensation Act for all of his employees, if he had read his policy and notified the State's Industrial Commission that he operated different kinds of businesses and that he desired insurance protection on all of his employees in all of these different businesses. The fact that the employer had protection under the State Workmen's Compensation Act for injuries to employees who worked on the gravel pit premises gave him absolutely no protection against injuries sustained by employees who worked elsewhere.

### Total Disability

According to a late and leading higher court decision, in the state of Louisiana, an employee who is so disabled that he cannot perform his regular and normal duties is "totally disabled" and entitled to receive compensation specified by the State Workmen's Compensation Act.

For example, in *Myers v. Jahncke Service, Inc.*, 76 So. (2d) 436, it was shown that an employee, named Myers, met with an accident wherein his right hand was so badly mangled that the physicians amputated the hand 2 in. above the wrist. After the accident, Myers did no work whatever for over a year, when he was re-employed by his former employer for performance of light work. Myers was carried on the payroll at an hourly rate of pay approximately that which he earned prior to the accident.

In subsequent litigation, the higher court held that Meyers was entitled to receive compensation, under the State Workmen's Compensation Act, for total disability. The court said:

"We are dealing with a workman who is incapacitated from carrying on his former job and who has been re-employed to perform the duties of another and entirely different occupation. Myers, although in a crippled condition, was able to carry out and undoubtedly did carry out all duties required of him chiefly in supervising the men placed under his charge and in instructing them as to how they should perform their work, and in pointing out to them what they should do. It is conceded that Myers, because of the amputation of his right hand, will be forever incompetent and physically unfit to perform his regular duties or any other similar manual duties, and therefore he must be classified as totally and permanently disabled."

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Abram Geist Kurtz, founder of the A. G. Kurtz Stone Quarries in Ephrata and Denver, Pa., died recently at the age of 87.


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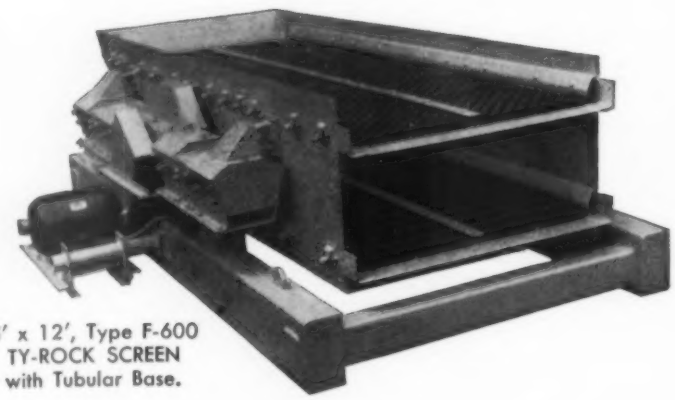

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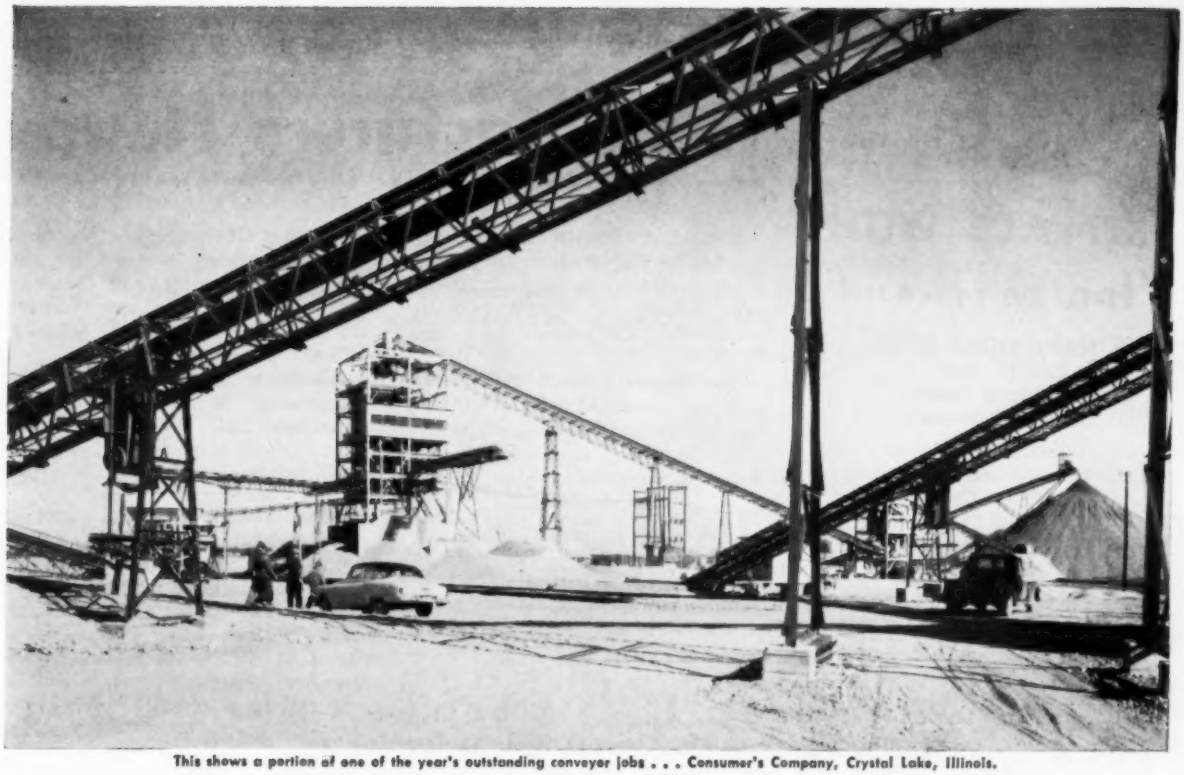

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Then Barber-Greene developed a unique system of standardized conveyor components that quickly outdated ordinary methods of erection, operation and maintenance. Soon standardized conveyors were known for:

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**Low-cost erection.** Conveyors get into operation sooner with big savings in engineering costs.

**Unmatched flexibility.** Interchangeable parts simplify lengthening or shortening of conveyors to meet changing needs.

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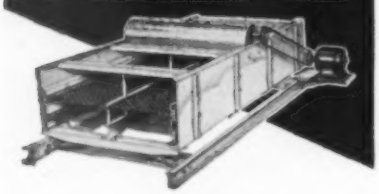
**UNIVERSAL**
**OFFERS THE BEST IN VIBRATING SCREENS AT THE LOWEST PRICE**



Before you buy, be sure to get a copy of the new UNIVERSAL Catalog #1501

There's a model to fit your particular requirement, priced within the smallest budget.

Write today for free catalog #1501

**UNIVERSAL VIBRATING SCREEN CO.**
Racine, Wisconsin
Quality Screens Since 1919

# Manufacturers' News

ROBERT A. BROWN has been appointed to the newly created position of vice-president and general sales manager of Borg-Warner International Corporation, Chicago, Ill.

Mr. Brown joined the company as controller in October, 1951. He was elected treasurer the following year and was appointed to the board of directors in March, 1956.

The appointment of LESTER ALEXANDER to the newly-created position of works manager and DONALD HUBER as plant superintendent of Marion Metal Products Company, Marion, Ohio, have been announced.

In his new post, Mr. Alexander will have complete charge of production operations. Mr. Huber will assist Mr. Alexander and supervise all production operations.

L. Alexander

D. Huber

Mr. Alexander has been with Marion since March, 1945. He was production control manager for two years. Mr. Huber joined Marion in 1947 as a foreman in the structural department and became assistant plant superintendent in 1955.

The Electro-Alloys Division of American Brake Shoe Company, New York, N. Y., has announced the appointments of CLAUDE E. CHRISTIE and WILLIAM D. RADDATZ as vice-presidents.

Mr. Christie, works manager of the division's plant at Elyria, Ohio, has been with the company since 1923. In his new position as vice-president, Mr. Christie will continue to act as works manager.

Mr. Raddatz, sales manager of the division since 1955, has been with the company since 1937. As vice-president he will continue as sales manager.

Koppers Company, Inc. has been awarded another contract for the design, procurement, and construction supervision of a blast furnace for ILVA, Alti Forni E Acciaieri D'Italia of Genoa, Italy.

The new blast furnace will be constructed at ILVA's plant at Piombino, Italy. The first Koppers blast furnace is being constructed at the firm's Bagnoli Plant near Naples.

The Westefield, Mass., plant of the Fruehauf Trailer Company, Detroit, Mich., has been adjudged the winner of the top award in the 1956 nation-wide truck-trailer manufacturing plants safety contest sponsored by the Truck-Trailer Manufacturers Association. During 1956 the Fruehauf Westfield plant completed nearly 1,000,000 working hours with only three lost-time accidents.

This marked the third successive year that a Fruehauf plant has won the highest safety contest honors among America's truck-trailer plants. In the 1954 contest, Fruehauf' Memphis, Tenn., plant won first place and in 1955 the Avon Laek, Ohio, plant was the winner.

ALFRED G. FORSSELL, consulting engineer for the Morris Machine Works, Baldwinsville, N. Y., retired on July 6 after 35 years with the firm.

Mr. Forssell, recognized as one of the foremost authorities on pumping of slurries and dredge operations, served as president of the Morris Machine Works for five years, until his resignation in 1954. At that time he became consulting engineer for the firm.

Chrysler Marine and Industrial Engine Division, Chrysler Corporation, Detroit, Mich., has appointed the following firms Chrysler industrial engine dealers:

Western Industrial Engines, Inc., 735 Broadway, Denver, Colo.; Dependable Motor Parts Corporation, 2705 Bailey Ave., Buffalo, Erie County, N. Y.; The Dixie Irrigation Company, Memphis, Tenn.; B. & C. Motors, Muleshoe, Tex.; Midwest Parts & Supply Corporation, 749-51 Washington St., Gary, Ind.; and 54 Motors, Inc., 54th and Sullivan Streets, Guymon, Okla.

# *FULLER ROADRANGER® Transmission standard in new LeT-WesCo truck*

Fuller's 9-speed R-1150 ROADRANGER Transmission was selected for the revolutionary new 30-ton LeTourneau-Westinghouse off-road hauler "... because of the wide range of gear selection and speeds, plus the fact that it shifts easily and quickly."

Merle R. Yontz, President, says: "We wanted a tough, fast, high-production hauler which would be cheaper to run, simpler to maintain, and easier to operate—one that would make more money per trip for its owners."

So, the LW-30 features the new Fuller R-1150 ROADRANGER Transmission, designed specifically for extremely heavy-duty off-highway service. Advantages:

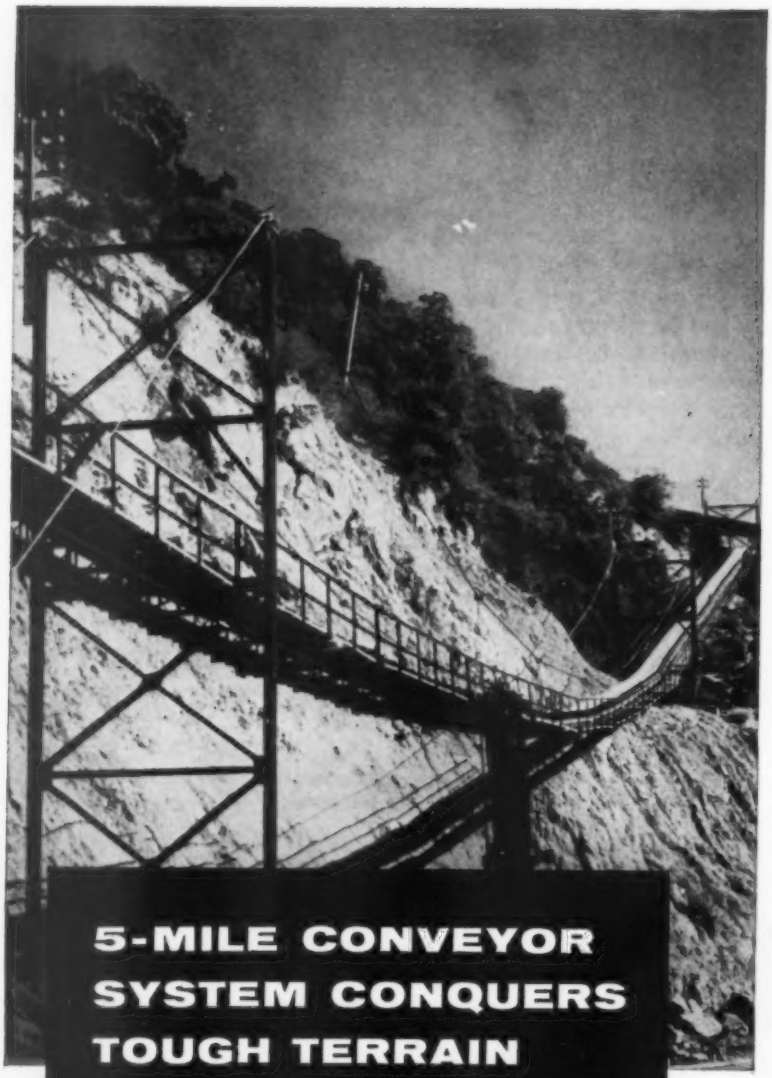
- No gear splitting—9 selective gear ratios are evenly and progressively spaced
- Pre-selective countershaft brake for easier, quicker shifts
- Average 38% between ratios
- One shift lever controls all 9 forward and 2 reverse speeds
- Engines operate in peak hp range with greater fuel economy
- Less driver fatigue—1/3 less shifting than with comparable multi-speed transmissions
- Range shifts pre-selected—automatic and synchronized

Check with your local truck dealer for the *right* Fuller Transmission for your job.

New LeT-WesCo LW-30 truck, powered by 375 hp Cummins 4-cycle, turbo-charged, V-8 engine, features Fuller 9-speed R-1150 ROADRANGER Transmission.

**FULLER**
Fuller
**TRANSMISSIONS**

FULLER MANUFACTURING COMPANY, Transmission Division, Kalamazoo, Michigan • Unit Drop Forge Division, Milwaukee 1, Wisconsin • Shuler Axle Company, Louisville, Kentucky (Subsidiary) • Sales & Service, All Products, Western District Branch, Oakland 6, California and Southwest District Office, Tulsa 3, Oklahoma.



**5-MILE CONVEYOR SYSTEM CONQUERS TOUGH TERRAIN**

To build India's huge Bhakra Dam, sand and gravel must be brought over three miles of mountainous terrain. In one section a suspension span supports a 1700-ft. long, 36" wide belt conveyor which carries 750 tons per hour at 485 FPM up a 107-ft. lift. Another two miles of belt conveyors move aggregate through processing operations.

Equipment, including 51 conveyor units, 25 speed reducers, vibrating equipment, and other machinery, was designed and manufactured by Hewitt-Robins. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

**HR HEWITT-ROBINS**

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

CHARLES H. TOPPING, senior architectural and civil consultant for E. I. du Pont de Nemours and Company, Wilmington, Dela., has been elected president of the Building Research Institute, technical society for the building industry, for the 1957-58 year.

Mr. Topping, who was vice-president and chairman of the membership committee, succeeds Edmund Claxton, director of research for the Armstrong Cork Company, Lancaster, Penn., who has just completed two terms as BRI president.

HAROLD L. HUMES, vice-president of the Baldwin-Hill Company, Trenton, N. J., manufacturer of home and industrial insulation, was named vice-president.

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Wilfred R. Lewis, a field sales manager with the company's Canadian subsidiary for the past two years, has been appointed a district sales manager for the Pacific Northwest territory by Four Wheel Drive Auto Company, Clintonville, Wis.

Mr. Lewis will be in charge of FWD sales in Washington, Oregon, Idaho, Alaska, and British Columbia. He will be headquartered at Seattle, Wash., where he will work with dealers handling FWD's four and six-wheel-drive logging, road maintenance, snowplowing, construction, ready-mix, utility, transport, and other heavy-duty trucks.

W. R. Lewis

B. A. Haney

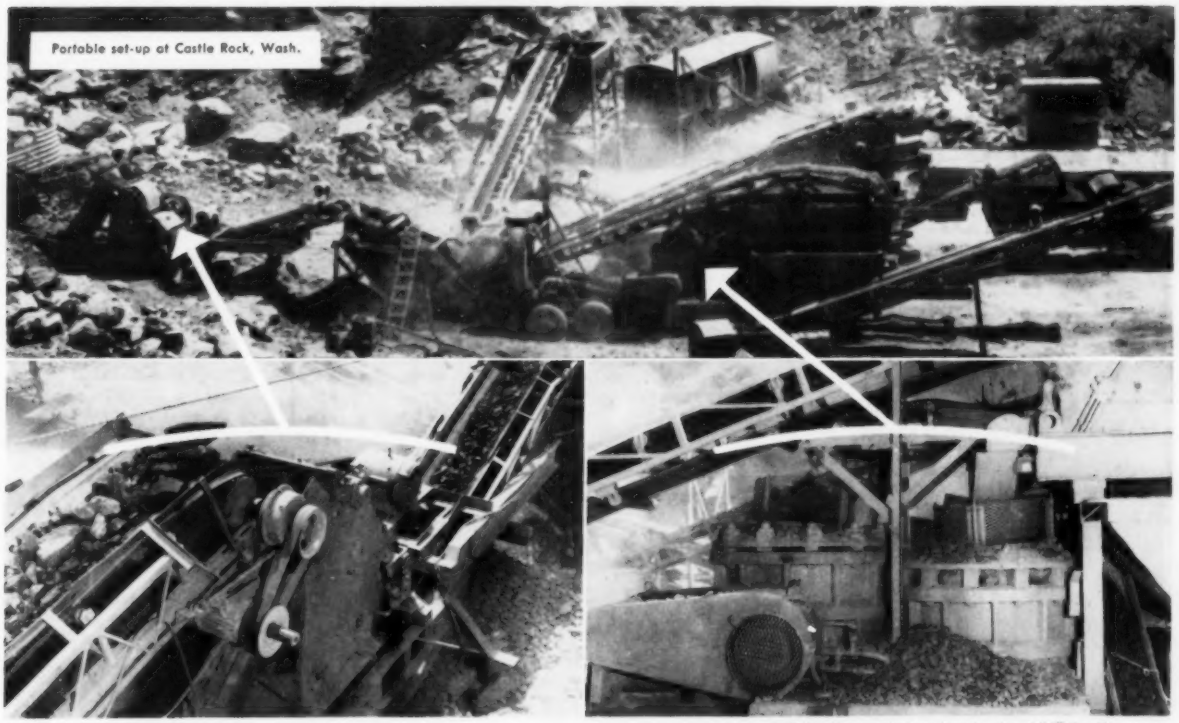
Byron A. Haney has been appointed Northwestern sales manager, with headquarters in Seattle, Wash., for the Bucyrus-Erie Company, South Milwaukee, Wis.

Mr. Haney has been with Bucyrus-Erie since 1929. In his new position he will be responsible for the sales of all company products in Washington, Oregon, Idaho, Montana, Alaska, and the Yukon territory.

---

The Harnischfeger Corporation of Milwaukee, Wis., has appointed the Florida Gas & Chemical Corporation, Hollywood, Fla., as dealer throughout southern Florida for the firm's complete line of P&H welding equipment.

# Portable plant uses KUE-KEN® jaw and gyratory crushers to get highest capacity at lowest cost




30" x 15" Kue-Ken jaw crusher in primary crushing

36" Kue-Ken gyratory medium bowl and 36" Kue-Ken coarse bowl permit more flexible control of product size

Kue-Ken Crushers are the most economical and practical for portable plants. They produce more tons per hour with less weight and space requirement than any other crushers. Higher crushing speed of Kue-Ken jaw crusher gives greater capacity and more uniform product. The crankcase-type lubrication system and elimination of jaw plate rubbing reduces horsepower requirement. Mechanism operates in bath of clean, filtered oil with dirt and grit sealed out. Overload or tramp iron actuates safety device that instantly releases flywheel avoiding damage to crusher. Kue-Ken gives the capacity needed with a smaller size crusher. Study the savings to be made in the chart below. Kue-Ken gyratory crusher fits in where headroom is limited making important secondary crushing practical.

All Kue-Ken crushers operate on the patented principle of "Crushing without rubbing." Jaw plates and liners last longer.

Table of tons per hour that will pass through crusher with jaws set at dimension shown when measured in the closed position.

Table is based on crushing average hard, dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed.

| Kue-Ken crusher size | ¾" | 1" | 1¼" | 1½" | 2" | 2½" | 3" | 3½" | 4" | 5" | 6" | Horsepower range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24" x 12" | 22 | 26 | 32 | 36 | 43 | 50 | 56 | | | | | 15 to 30 |
| 30" x 12" | 32 | 35 | 38 | 42 | 55 | 70 | 76 | 85 | 110 | | | 20 to 30 |
| 36" x 10" | 38 | 47 | 57 | 67 | 80 | 91 | 105 | | | | | 25 to 40 |
| 36" x 20" | | | | | 70 | 82 | 90 | 115 | 135 | 160 | | 30 to 50 |
| 42" x 25" | | | | | 90 | 120 | 150 | 165 | 180 | 215 | 250 | 40 to 60 |

*WRITE FOR CATALOG*

## KUE-KEN® CRUSHERS

*"CRUSHING WITHOUT RUBBING"*

**STRAUB MFG. CO., INC. 8386 Baldwin St., Oakland 21, Calif.**

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

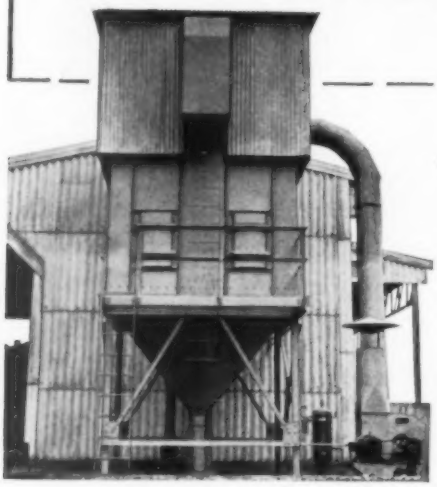
**DEALERS:**

SEATTLE, WASH. .....Washington Machinery Co.
SALT LAKE CITY, UTAH .....Lund Machinery Co.
SAN ANTONIO, TEX. .....Closner Equipment Co.
PORTLAND, ORE. .....Contractors Equipment Co.
LOS ANGELES, CALIF. .....Garlinghouse, Fremon Co.
PHOENIX, ARIZ. .....Stapley's
DENVER, COLO. .....Union Supply Co.
CASPER, WYOMING ....Moss Equipment & Supply Co.
VANCOUVER, B. C. .....Universal Equipment Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

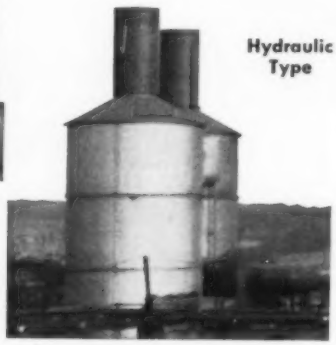
# Make your air come clean!

## Give Norblo the job of fitting one or more modern types of Collecting Systems to your Dust or Fume problems



Automatic Bag Type

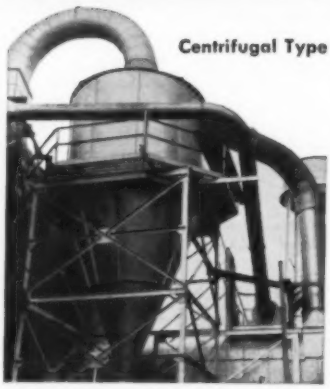
Clean air pays dividends —in employee health and comfort, in protection of work in process, and often, to reclaim valuable materials.



Hydraulic Type

Norblo engineers and manufactures the three types of dust collecting equipment illustrated here in actual use. Norblo recommends the type or combination of types that will give you the best results at most economical cost.

High recovery at low operating and maintenance costs is assured by Norblo engineering and guaranteed performance . . . If you have a dust or fume problem, it pays you to consult Norblo.



Centrifugal Type

**The Northern Blower Company**

6407 Barberton Ave., Cleveland 2, Ohio • OLympic 1-1300

**Norblo** ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES


J. N. Bayley has been promoted to the position of manager of the Atlanta Branch of the J. I. Case Company, Racine, Wis. Mr. Bayley, for the last three years assistant manager in charge of sales for the Atlanta Branch, replaces T. E. Moss, who has resigned.

The Atlanta Branch supervises the southeastern area, which includes Georgia, Alabama, Florida, and part of North Carolina and Tennessee, and is now handling the distribution of Case industrial crawler and wheel tractors, in addition to agricultural tractors and machinery.

Mr. Bayley has been with Case for 17 years, working in different capacities in office, collection, and sales work. He spent several years in the Dallas Branch working different territories in Texas and Louisiana. In 1949 he was appointed assistant manager of sales at the Oklahoma City Branch, and later held the same position at the Atlanta Branch.

---

Appointment of John Trumble as factory manager of the Aurora (Ill.) works of the Thor Power Tool Company of Chicago has been announced. Mr. Trumble has been active in the plant supervision phase of the tool industry in Michigan for 10 years.

---

Warren B. Johnson has been named product manager for insulated siding products and William J. Marshall as sales service representative of the insulating board division of Kaiser Gypsum Company, Inc., in Oakland, Calif.

Mr. Johnson will supervise Kaiser Gypsum's entire insulated siding market with headquarters in the California Building in Oakland.

---

Eaton Manufacturing Company in conjunction with Brazilian interests has formed a new automotive parts manufacturing company, Eaton S. A. Industria de Pecas e Acessorios, with headquarters in Sao Paulo, Brazil.

Tasso Pinheiro of Tavares & Pinheiro S. A. will be the director-president of the new company. He will be assisted by a director-superintendent and a financial director from Eaton.

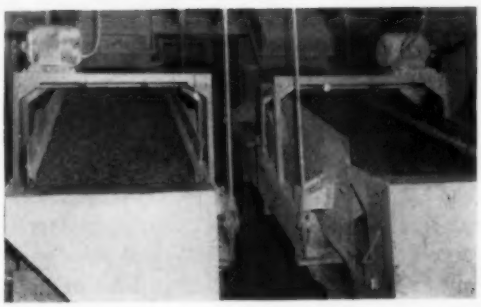
Construction will begin soon on a modern one-story factory building located on an 11-acre site near the city of Sao Jose dos Compos, about 60 miles from Sao Paulo. The new factory is expected to be ready for production early in 1958.

# *Mr. Producer:*

## Beat The Profit Squeeze

## With High Tonnage

# *Seco Vibrating Screens*



There's just one answer to today's strong competition and shrinking profits. . .

Make a better product . . . and make it at the lowest cost per ton!

This is true whether your plant is large or small, whether you're screening sand, stone, gravel, ag-lime, slag or whatever you produce.

This is why you should put SECO vibrating screens to work for you: Smooth operating, long-life SECO screens help you make a *better* product, a *cleaner, more accurately sized* product to meet today's demands and tough specifications . . . *and* dependable SECO screens will help you up tonnages and reduce cost per ton.

They're built that way . . . to take the volume without whimpering . . . and to stay on the job year after year producing the clean, accurately sized materials your buyers demand.

***Go Modern for Profit . . .***

**with Seco Vibrating Screens**

*SEND FOR CATALOG NO. 204*

**SCREEN EQUIPMENT CO., INC.**

BUFFALO 25, N. Y.

**SECO**

**TRUE CIRCULAR ACTION**

**VIBRATING SCREENS**

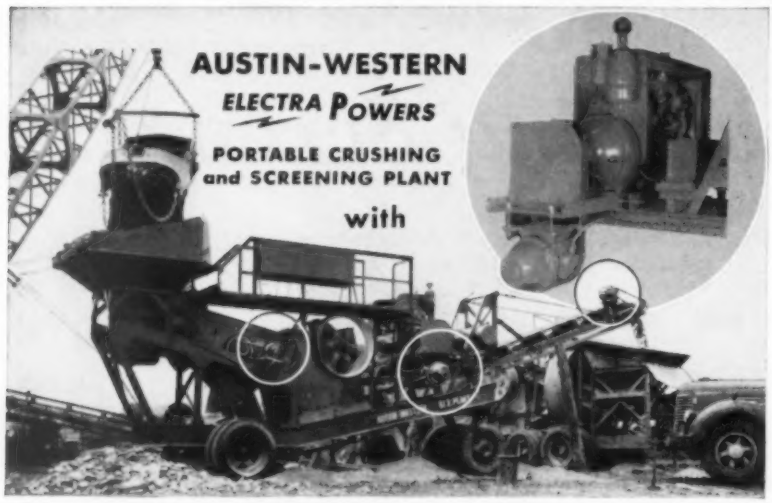
Appointment of several new distributors for sales, parts, and service of FWD transport tractors, dump haulers, and ready-mix trucks have been announced by officials of the Four Wheel Drive Auto Company, Clintonville, Wis.

General Truck & Equipment, Inc., 2535 University Ave., St. Paul, Minn., will be exclusive FWD dealer in the Minnesota counties of Hennepin, Ramsey, Washington, Dakota, and Anoka.

Humphrey Truck Sales, 136 E. Mineral Street, Milwaukee, Wis., is the new FWD distributor in eastern Wisconsin, in the counties east of and including Green, Dane, Columbia, Dodge, Fond du Lac, Winnebago, Outagamie, Brown, Kewaunee, and Door.

Burg & O'Connor Motors, 16-18 N. Main St., Clintonville, Wis., has been appointed dealer in Shawano, Portage, Waupaca, and Waushara counties of Wisconsin.

Midwestern Engine and Equipment Co., Inc. 4645 Sapulpa Rd., Tulsa, Okla., has been appointed a new dealer for sales, parts, and service of FWD transport, highway maintenance, ready-mix, and oilfield trucks in Oklahoma.


WINPOWER GENERATORS

Baldwin-Lima-Hamilton Corp.,—Construction Equipment Division—Lima, Ohio, manufacturers of AUSTIN-WESTERN crushing and screening equipment shown here, use WINPOWER generators for electric power. They know that by using WINPOWER powered electric motors and speed reducer drives on conveyors, feeders and screens they can eliminate long drive belts and drive shafts, expensive to buy and difficult to replace in case of failure in the field. *Whatever* your need there is a WINPOWER Generator for you. Generators as well as gasoline or diesel powered electric plants in capacities from 400 watts to 100 KW. You can save time and money with WINPOWER. See your WINPOWER Distributor or phone, write or wire at once for complete illustrated folder and specifications.

**WINPOWER MFG. CO.**
NEWTON, IOWA • U.S.A.


The National Bearing Division of American Brake Shoe Company, New York, N. Y., has appointed ALBERT L. HUNT and PAUL J. BAUMAN as vice-presidents.

Mr. Hunt was formerly general manager of the division's plant in St. Louis, Mo. In his new capacity he will be in charge of all manufacturing operations for the division's plants in St. Louis; Meadville, Pa.; and Clearing, Chicago. He will continue to be located at division headquarters in St. Louis.

Mr. Bauman was formerly general manager of National Bearing's plant in Meadville, Pa. As vice-president, he will be responsible for the industrial sales of the entire National Bearing Division. He will continue to be located in Pittsburgh.

Charles E. Martin was appointed general service manager and a member of the executive committee of the Cummins Engine Company, Inc., of Columbus, Ind. He succeeds H. E. Bollwinkel, who resigned.

As general service manager, Mr. Martin assumes overall responsibilities for the Service Division of the company.

Mr. Martin joined the Cummins Company in 1943 and has been employed in the sales and service divisions. Prior to his appointment to his new post, he was manager of Field Service.

C. E. Martin

W. A. Haley

W. A. HALEY recently joined Caterpillar Tractor Co., Peoria, Ill., as mining representative for the sales development division. Mr. Haley will specialize in metals market operation.

The J. I. Case Company's first annual Industrial Dealer meeting at Burlington, Iowa, was attended by approximately 400 persons, representing 140 Case dealerships throughout the eastern, Midwestern, and Southwestern sections of the United States and Canada.

Highlights of the meeting were a Tractorama display of the complete line of Case products and field demonstrations of company and competitors' equipment.

## Now! A Complete, Compact Service Station on a Two-Wheel Trailer!

# ALEMITE
REG. U. S. PAT. OFF.

*on-the-job*

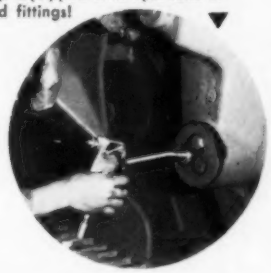
# Power Lubrication Rig

## OFFERS 3 BIG SAVINGS!

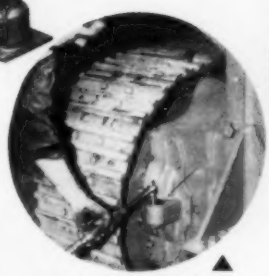
*1. Save Time*—bring lubrication right to the job, safely, efficiently! *2. Save Money*—cut lubrication downtime! *3. Save Equipment*—give the added protection of positive power lubrication!

The compact new rig shown here is just one example of how Alemite can furnish you a "custom-made" unit that fits your exact needs. Does the *complete* job! Shown equipped with the following standard Alemite products:

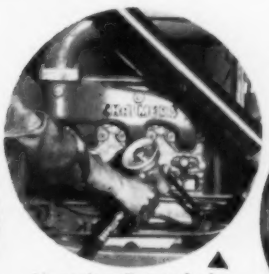
- **Air-operated high-pressure lube gun.**
- **Air-operated gear oil pump.**
- **Loader pump for refilling hand gun.**
- **"Big-A" Bucket Pump.**
- **55-gal. air-operated motor oil pump.**
- **Bank of 4 hose reels, including high-pressure, air, gear lube and motor oil lines.**
- **Standard air compressor.**



**Fast, easy, high-pressure lubrication of all bearings equipped with hydraulic or button-head fittings!**



**Quick filling of final drives, gear housings, transmissions!**



**No engine oil wasted—delivers exact amount of oil required!**

**Air line equipment for on-the-job tire inflating, air cleaning!**

# ALEMITE
REG. U. S. PAT. OFF.

**Division of STEWART-WARNER CORPORATION**

STEWART SW WARNER

### Mail Coupon Today For FREE BOOKLET!

**ALEMITE, Dept. L 97**
**1850 Diversey Parkway, Chicago 14, Illinois**

Please send me complete information on the newest Alemite Portable Service Stations and Alemite equipment. No obligation, of course.

Name .....
Company .....
Address .....
City ..... Zone ..... State .....

*The New Champ!* →

# The

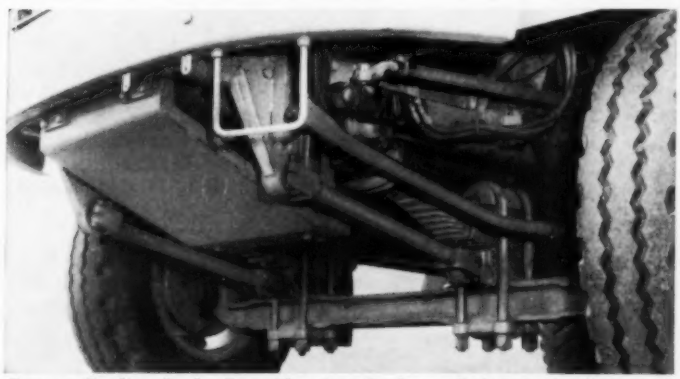
# ESTABLISHES NEW RECORDS BY MOVING

Out on the job these specially designed Autocars are beating every claim we made for them. Rated at 15 tons, they haul their huge loads at top speeds up to 39 mph. And their combination of fast axle ratios with a 10-speed transmission permits them to operate at higher speeds on up-grades, too. Whether they're at work on road construction or in a quarry, they're doing the job faster and more efficiently than ever before.

# Autocar AP-15

## MIGHTY LOADS ON A FASTER TRIP CYCLE

**Yes. The AP-15 is designed to do the job better**



**Frame, Radius Rods, Free-Floating Springs.** Reinforced, alloy steel frame with bolted construction is rigid enough to keep components in line and flexible enough to absorb torsional stresses. Heavy-duty radius rods, front and rear, hold axles in alignment with frame. Free-floating springs absorb road shocks and assure long tire life.

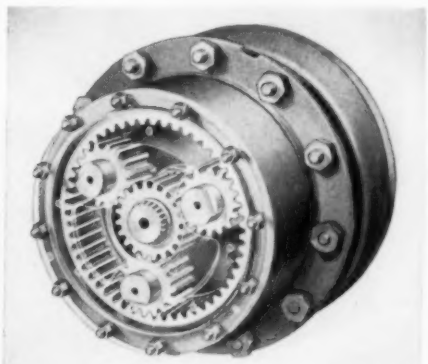
• • •

This Autocar rewrites the book of rules for profitable hauling of fill, aggregate, rock and similar materials. Before you buy your next truck, it will pay you to talk to your White-Autocar Distributor about the rugged, powerful AP-15.

White Autocar

**AUTOCAR TRUCKS**

**AUTOCAR DIVISION · The White Motor Company**
**Exton, Pa.**

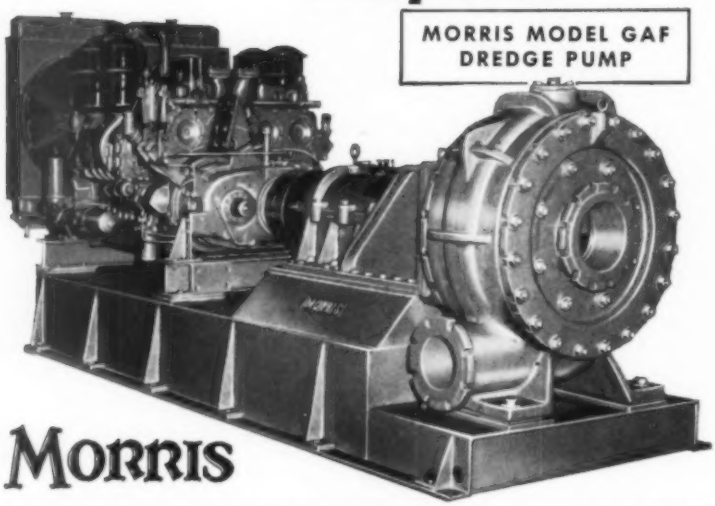


**Planetary-Gear Rear Axle.** The AP-15 is built around this basic component because it delivers the torque from the powerful Diesel engine all the way back to the rear wheels. In fact it places the highest numerical gear reduction right in the wheels, thus decreasing torque load on axles and differential. It assures long gear and shaft life and makes the units transmitting power as strong and dependable as the rest of this giant truck.

**Autocar Driver Cab, Power Steering.** Designed and built to provide maximum comfort as well as strength and durability, the Autocar Driver Cab permits the driver to put in a full day without undue fatigue. Full hydraulic power steering makes this monster truck as easy to handle as a passenger car. The unique "Full-Adjust" seat allows the driver to find his own most comfortable position.

# For COARSE REFUSE Disposal

MORRIS MODEL GAF DREDGE PUMP



MORRIS

## DESIGN, PERFORMANCE, DURABILITY
### Gives PEAK Pumping Economy

The dredge pump is the vital heart of any successful dredging or hydraulicking operation. Its ability to maintain high vacuum and freedom from mechanical difficulty makes the difference between profit and loss.

Morris Dredge Pumps, with their superior design and built-in dependability will consistently develop and maintain the high vacuum necessary to profitable production.

Solids output of Morris Pumps so far exceeds that of ordinary pumps that contractors refer to them as their "secret weapon". Over 90 years experience in hydraulic design and testing are built in every Morris Pump. Let Morris help you "put more on the bank".

If you want to talk performance *and* durability write for Bulletin 184-A or contact your Morris representative.

MORRIS CENTRIFUGAL PUMPS

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
*Sales Offices in Principal Cities*


DAVE FLOOK of Denver, Colo., has been named sales representative for the Raymond Bag Corporation in the Rocky Mountain area with offices in the Commonwealth Building, Denver.

Mr. Flook has completed the sales training course begun recently for Raymond representatives at the firm's headquarters in Middletown, Ohio.

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The General Tire & Rubber Company, Akron, Ohio, has elected MICHAEL GERALD O'NEIL as vice-president and executive assistant to the president. Mr. O'Neil was elected to the office of executive assistant to the president in 1951.

Along with Mr. O'Neil's election, the following officers were elected: W. O'Neil, president; L. A. McQueen, C. J. Jahant, T. F. O'Neil, D. A. Kemball, C. F. O'Neil, J. E. Powers, H. M. Dodge, J. A. Andreoli, vice-presidents; T. S. Clark, treasurer; F. W. Knowlton, secretary; C. A. Hill, J. Little, assistant treasurers; and J. L. Wade, assistant secretary.

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Harnischfeger Corporation, Milwaukee, Wis., has appointed B. W. THORPE sales manager for the Power Crane and Shovel Division. Mr. Thorpe has been associated with P&H since 1952, first as a salesman in the New York office and more recently as district manager of Harnischfeger's Florida territory.

Succeeding Mr. Thorpe as district manager of the Florida territory is J. E. LAFFEY, who has been associated with Harnischferger's Boston office as excavator salesman for several years.

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THOMAS A. MORETTI, acting plant manager of the Marion Forge Division of the Eaton Manufacturing Company, Cleveland, Ohio, has been named plant manager of this division. The Marion Forge Division supplements the operations of Eaton's Axle Division in Cleveland.

In his new position, Mr. Moretti assumes complete responsibility over the Marion operations, which include the production of various components for truck axles and brakes.

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Leschen Wire Rope Division of H. K. Porter Company, Inc., has released Bulletin No. 101, entitled *Abrasion*. It describes the principal causes of the destruction of wire rope by abrasion and lists numerous practical suggestions for minimizing its effects.

*Part of the equipment used in the excavating operation at Pima Mine, Arizona. Operations will be completed about January, 1957.*

# STOODY HARD-FACING in one of the WORLD'S LARGEST OVERBURDEN STRIPPING PROJECTS

A huge stripping operation is in progress a few miles south of Tucson, Arizona, at the Pima Mine where Utah Construction Company is moving 6,000,000 cubic yards of overburden, including 600,000 yards of waste rock, to expose the copper ore deposit 210 feet below the surface. The job was begun in October of 1955 and will probably be completed by January of 1957.

An unusual feature of this project is the method of moving the overburden, a highly abrasive alluvial soil. Instead of the usual blast hole equipment, shovels and dump trucks, the job is primarily handled with rippers and scrapers. After the rippers make a pass, scrapers pushed by crawlers pick up the loose material and haul it to a fill. The equipment inventory includes a D9 Cat ripper, an HD21 A-C ripper, 10 MRS scrapers, two Cat 12 motor graders, six A-C and two D9 Cat pushers, four LLD 30-yard trucks, a Marion 7-yard shovel, a Michigan dozer and two water wagons.

One out of three shifts is devoted to maintenance and repairs. Hard-facing of many pieces of equipment is speeded up by the use of the semi-automatic welder applying Stoody 100. On ripper and bucket teeth which are subject to severest wear, Stoody Tube Borium is applied manually as a final overlay.

Hard-facing methods used here are described in the Stoody Guidebook and the folder on semi-automatic wires. See your Stoody dealer for a copy of this literature (check the yellow pages of your phone book) or write direct.

*RIPPER TEETH—are hard-faced with two close, parallel beads of Stoody 100 across the point with an open-bead cross pattern up the tooth face. Points also receive a bead of Tube Borium on the under sides.*

*SHOVELS AND TEETH—at noon and at the end of the second shift tooth points are touched up with Tube Borium. Three stringer beads on the tooth are equivalent to a full inch of bare tooth wear. With this treatment teeth usually last six to eight shifts. Repointer bars are welded on worn teeth, hard-faced semi-automatically with Stoody 100 and finished off with Tube Borium.*

*SIDE BLADES ON LOADERS—are subject to severe wear from "scooping" action. Stoody 100 holds it in check.*

**STOODY COMPANY**
11971 E. Slauson Ave.
Whittier, California

*First step to successful blasting . . .*

**AUSTIN EXPLOSIVES**

Each blasting operation has conditions which make it unique. These may be in the form of hardness of the rock to be shot, excessive moisture, fragmentation desired . . . or the amount of ventilation available if working in underground areas.

Austin produces an explosive to successfully meet every combination of conditions. Among its complete stocks are ammonia grades, ammonia gelatins, permissible dynamites, nitroglycerin and nitroglycerin gelatins.

**AUSTIN AKREMITE**

A popular item in the Austin line is Akremite. This combination of insensitive ammonium nitrate with carbon is safer . . . simpler to use . . . easier to store. Where applicable, it can cut blasting costs up to 50%.

There is an Austin explosives engineer in your area. He'll be glad to survey your job requirements and make common sense suggestions on how you can cut costs and increase production with Austin explosives.

AA-4481

USED IN 1833 AUSTIN EVER SINCE

**AUSTIN**
**POWDER COMPANY**
CLEVELAND 13, OHIO

explosives ◆ permissible dynamites ◆ mine tools
detonating fuse and clips ◆ AP drill heads ◆ Akremite ◆ primers

Appointments of DONALD E. SCHWENDEMANN as manager, organization and business management, and CHESTER B. CLUM as Chicago regional manager for the Detroit Diesel Engine Division, General Motors Corporation, Detroit, Mich., have been announced.

Mr. Schwendemann, who has been Chicago regional manager, is responsible for business management programs for Detroit Diesel distributors in his new position.

Mr. Clum joined Detroit Diesel as a General Motors Institute student in 1943. He had served in various sales department positions within the division before being transferred to the Chicago office as a zone sales manager.

---

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has named NORTON E. CROFT Pacific regional representative to industries using processing machinery department products. Mr. Croft was formerly supervisor of crushing machinery sales in the processing machinery department.

W. F. HACKETT, formerly application engineer in the processing machinery department, was named to succeed Mr. Croft.

ELMER C. MERTZ has been named supervisor of pyro-processing machinery sales, succeeding William H. Tock, who has resigned.

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Williams Patent Crusher & Pulverizer Company St. Louis, Mo., has appointed the Nelson Engineering Sales Company, 524 Grant Building, Pittsburgh 19, Pa., sales agent for the Pittsburgh territory.

Roland E. Nelson will provide his assistance as a consultant on the most efficient use of Williams equipment for crushing, grinding, shredding, air separating, and on the repair of Williams equipment already installed.

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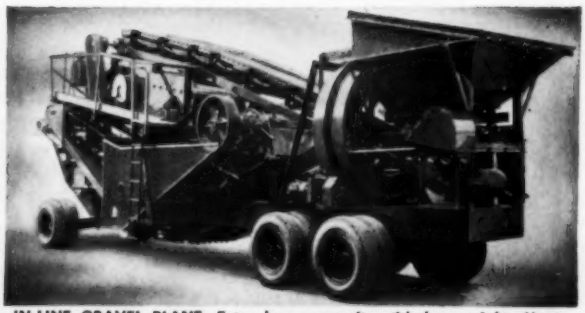
LOUIS E. DONDERO has been named manager of the West Allis plant of the Le Roi Division, Westinghouse Air Brake Company, Milwaukee, Wis., succeeding Hugh M. Little. In his new post, Mr. Dondero is in charge of all phases of product manufacturing at the plant, which produces air compressors and internal combustion engines.

Formerly manager of Le Roi's Cleveland Rock Drill plant, Mr. Dondero has also served as assistant production manager, production manager, and assistant works manager of the West Allis plant since joining the firm in 1946.

**PRIMARY PLANTS:** Use with Intermediate and Secondary Plants or alone for producing ballast. Jaw crushers 1524 to 3042 in size. Choice of portable apron or built-in feeder. Some have scalping screen ahead of crusher.



**IN-LINE GRAVEL PLANT:** Extra large capacity with low weight. Meets most highway load limits. Has 1036 jaw crusher, 30" x 24" rolls, 4' x 12' — 2½ deck vibrating screen . . . yet weighs only 55,900 lbs. on the road!

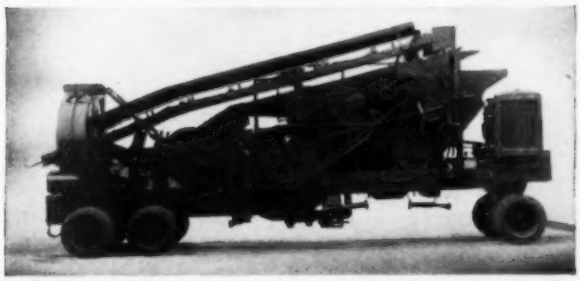
**INTERMEDIATE PLANTS:** Used with Primary and Secondary Plants to increase flexibility of operation and boost output. Meets highway height, width, and weight limits. Models offer choice of either jaw or roll crusher.

**SECONDARY PLANTS:** 4 models of Secondary Plants offer choice of 3018, 4022, and 5424 twin roll crushers or 4022 triple roll crusher with 3' x 10', 4' x 10', or 4' x 12' — 3½ deck vibrating screens.

**For men who like to underbid their competitors . . . (and make a nice profit, too)**

# Pioneer Portable Crushing Plants

**BOTTOM DECK FEED PLANTS:** Exclusive method of routing material through plant gives *twice* the effective screening area of conventional plants, also lets operator equalize load between jaw and roll crusher while plant is operating. These and other features, give extra capacity and unusual control of gradation. Four models.



**44 AND 45 SERIES:** Full deck sand screen rejects fines and small rock bypasses jaw crusher. These and regular Bottom Deck Feed features give extra big capacity. 4 full screen decks and spouting arrangement can produce 4 sizes of material at same time. Electric or mechanical drives.

PIONEER Distributors and PIONEER's own field engineers are experienced in all phases of aggregates production. They will be glad to study your project, analyze your needs, then help you design an efficient installation that will fit your need.

**Pioneer®**
**EQUIPMENT**

**Pioneer Engineering,** 3200 Como Avenue S.E., Minneapolis 14, Minnesota
Division of Poor & Company, Inc. • Chicago

Please send information on equipment checked below.

| | | |
|---|---|---|
| ☐ GRAVEL & ROCK PLANTS | ☐ JAW CRUSHERS | ☐ ORE FEEDERS |
| ☐ WASHING PLANTS | ☐ ROLL CRUSHERS | ☐ MECHANICAL FEEDERS |
| ☐ BITUMINOUS PLANTS | ☐ IMPACT BREAKERS | ☐ VIBRATING SCREENS |
| ☐ BITUMINOUS PAVERS | ☐ APRON FEEDERS | ☐ CONVEYORS |

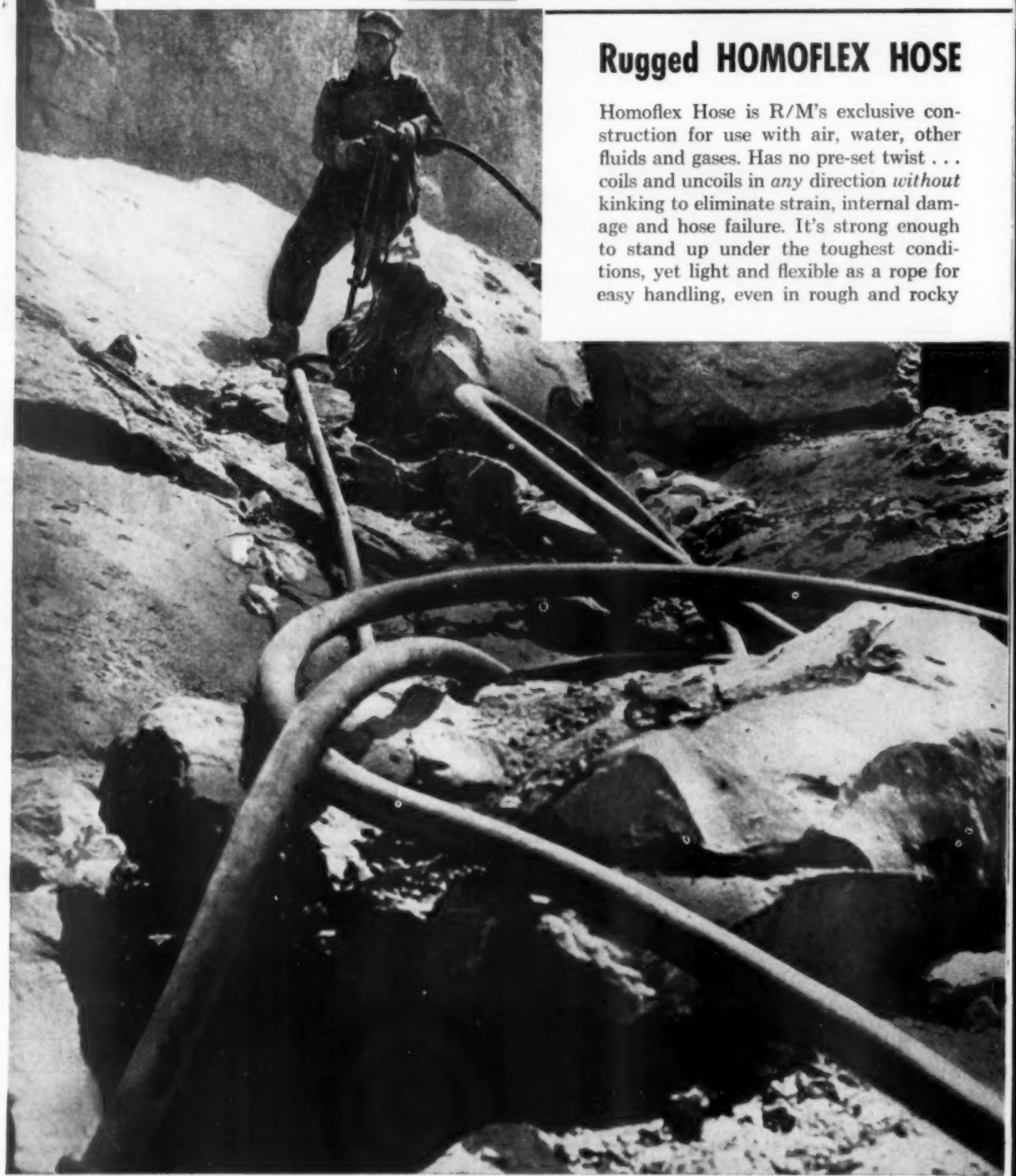
*Name* _____

*Company* _____

*Address* _____

*City* _____ *Zone* ___ *State* _____

# Users Say R/M HOSE AND BELTS



## Rugged HOMOFLEX HOSE

Homoflex Hose is R/M's exclusive construction for use with air, water, other fluids and gases. Has no pre-set twist . . . coils and uncoils in *any* direction *without* kinking to eliminate strain, internal damage and hose failure. It's strong enough to stand up under the toughest conditions, yet light and flexible as a rope for easy handling, even in rough and rocky

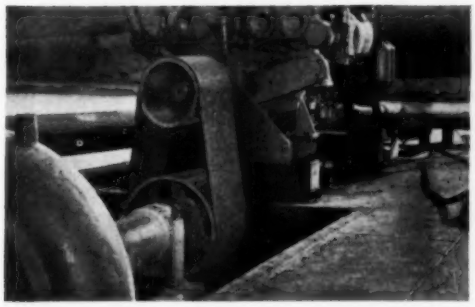
# Give You "More Use per Dollar"

## . . . is "Flexible as a Rope"!

conditions. Cover, strength member and tube are virtually inseparable. Uniform inside and outside diameters make Homoflex easier to couple, too.

You get "More Use per Dollar" *two* ways . . . Easier handling helps workers to get more work done . . . Hose lasts longer.

***Write for Bulletin #6879***



## Eliminate Belt Matching Problems with R/M POLY-V® DRIVE!

R/M's patented Poly-V Drive employs a *single, endless* V-ribbed belt — eliminating common V-belt matching problems. This new drive delivers up to 50% more horsepower capacity than an ordinary multiple V-drive. Just two cross-sections handle all drive requirements. Lower inventory of belts and sheaves — less maintenance. You get "More Use per Dollar."

***Write for Bulletin #6638***

**For the "Smoothest Running V-Belts Made" Specify CONDOR or R/M SUPER-POWER V-BELTS**

*Poly-V is a registered Raybestos-Manhattan Trademark.

## RAY-MAN CONVEYOR BELTS Haul Heavier Loads at Lower Cost

This heavy duty conveyor belt has the easy troughability and wear resistance to handle fuller, heavier loads. Cushioned strength members give resilience to the impact of shock loading . . . and flexibility to train naturally. Balanced double compensation construction relieves outer ply stress, prolongs belt life. Ray-Man Conveyor Belt resists gouging and ripping . . . holds fasteners much better than other types of belts . . . requires no breaker fabric. Like all Raybestos-Manhattan heavy duty belts, Ray-Man is moisture resistant and mildew-proof . . . and features the exclusive "XDC" Cover which greatly increases protection against wear, tear, cuts and abrasion . . . You get longer, trouble-free service . . . "More Use per Dollar."

Check also R/M's extra-cushioned Homocord belt for unusually abusive shock loading . . . and R/M Tension-Master for extra long lifts, high tensions.

***Write for Bulletin #6915***

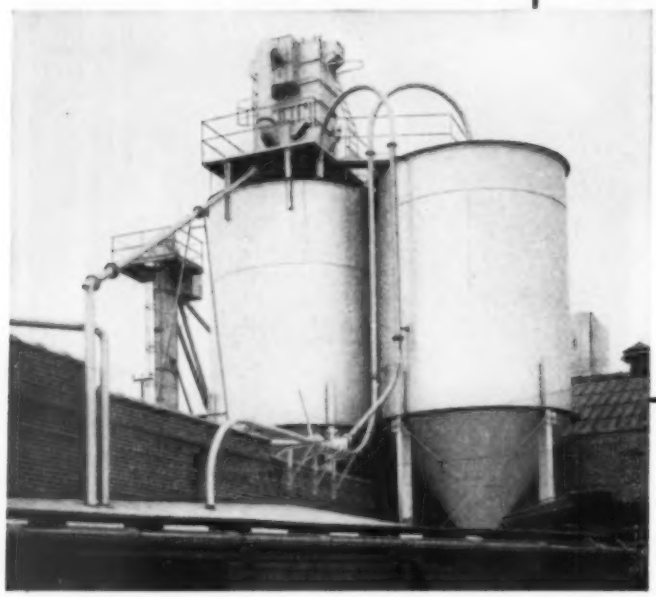
RM 702

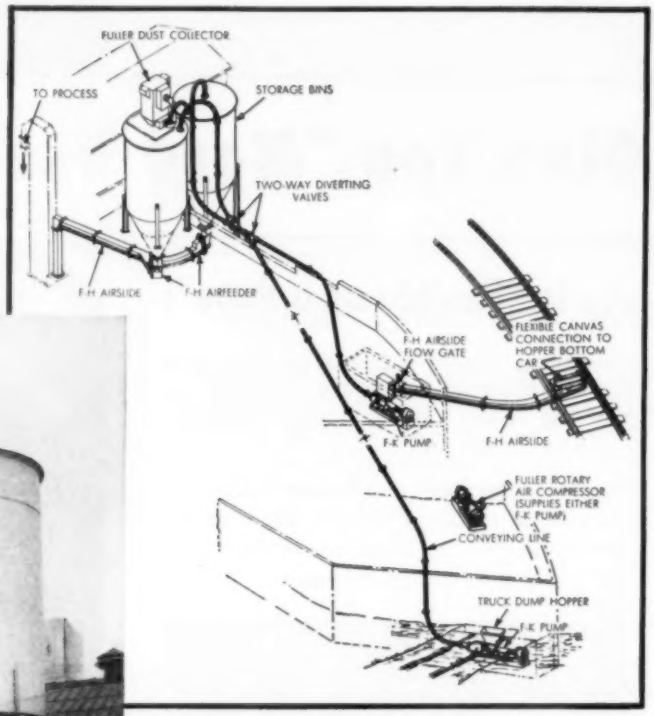
**BELTS • HOSE • ROLL COVERING • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES**

**MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY**

# RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls






# Unloading and Conveying System By FULLER--- Pays Off In Lower Operating Costs for *Certain-teed*

A few years ago, Certain-teed Products Corporation decided to find, if possible, more economical methods of operation in its York, Pa. plant. One problem given serious consideration was the handling of incoming limestone and slate filler dust received in bags, requiring costly, manual labor, resulting in breakage of bags with consequent loss of material and a dusty condition in the plant.

Together, Certain-teed and Fuller engineers made studies of their layout and came up with a solution—a combination of the Fuller-Kinyon Conveying System and F-H Airslides®.

Two Fuller-Kinyon Pumps are used. One conveys limestone dust from hopper-bottom cars, utilizing the Airslide to convey from cars to the pump located in a pit in the plant. This pump conveys to either one of the two storage bins . . . efficient, clean, rapid transfer from cars to storage. The other pump handles the slate dust, delivered in trucks, also conveying to storage. Withdrawal of either material from storage bins is accomplished with Airslides, which discharge to an elevator delivering to process.

Air for the pumps is supplied by a Fuller Rotary Single-stage Compressor, having a capacity of 482 c.f.m. at 20-lb. pressure. Low-pressure air, for the Airslides, is supplied by a small blower.

It is reported that the savings realized by the use of this Fuller system has paid for the installation in less than two years of operation.

Possibly your materials handling is antiquated and costly, which could be remedied by a comparatively small investment. Fuller's 30 years experience in pneumatic conveying of dry bulk materials can very well bring about substantial savings in your plant's operation. Why not write today for further information? No obligation at all.

FULLER COMPANY GENERAL AMERICAN TRANSPORTATION CORPORATION

**Fuller**

. . . . pioneers in harnessing AIR

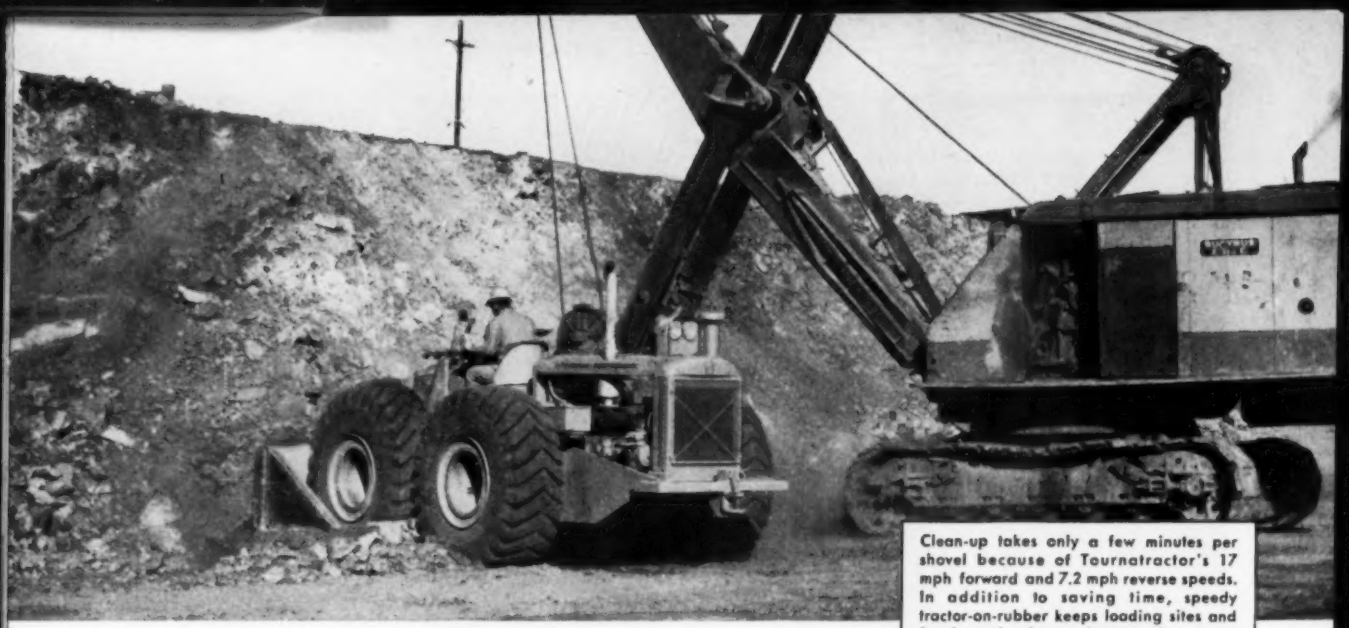
G-170
4424

**FULLER COMPANY**

**100 Bridge St., Catasauqua, Pa.**

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle



Clean-up takes only a few minutes per shovel because of Tournatractor's 17 mph forward and 7.2 mph reverse speeds. In addition to saving time, speedy tractor-on-rubber keeps loading sites and haul-roads cleaner because it can get around to each shovel more times per day than a crawler-tractor.

# Rubber-tired tractor

## speeds clean-up around 3 shovels

### 1 fast machine replaces 2 crawler-tractors

Working their Eagle Mountain Iron Mine, Eagle Mountain, California, Kaiser Steel Corp. find they get more clean-up work done faster with 1 Model C Tournatractor than if they assigned 2 crawler-tractors to handle the same job. The new tractor-on-rubber replaced one full-time crawler, and does the part-time plant and pit-maintenance work formerly assigned to a second track-type machine. The change to the faster, more maneuverable 210 hp Tournatractor enables the mine to keep haul units moving with less delays due to spillage or uneven pit floors.

### 3 to 4 times faster than crawlers

Tournatractor handles all clean-up assignments around 3 shovels. It shuttles back and forth at speeds up to 17 mph, which is 2 to 3 times faster than the top speed of most crawlers. In addition, reverse speeds to 7.2 mph allow unit to back away quickly without interfering with loading operations. Big, 21.00 x 25 low-pressure tires provide plenty of flotation and traction. They stand up well despite abrasive and rocky footing around pit floor.

### Also used for pulling and pushing

In addition to clean-up and bulldozing, the 210 hp tractor pulls air compressors to drilling sites and moves the frame supports which carry electric cable for shovels, drills, and other equipment.

### Get all the facts

Owners around the world are taking advantage of the ease of maintenance, durability, speed, and high production of the Tournatractor. If you are interested in these same benefits for your pit, get all the details from your Distributor today.

Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1548-M-1

Tournatractor also cuts downtime for air compressors and other equipment when moving them from one location to another. Tournatractor gets on the job quicker...gets to the next assignment quicker. 1500 ft. is less than a minute away.

**LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

**Where quality is a habit**

*at Pacific Building Materials, Portland Oregon . . .*

# UP GOES ANOTHER SAND PREP

## *No. 8 in a series of steady WEMCO producers*

1956 addition to this Portland company's sand recovery operation is the 36-inch Wemco Sand Preparation Machine being installed above. It has an outstanding performance record to live up to! For instance, since the first of 7 similar Wemco units went into operation in 1948, plant manager Howard Hamlin reports that to date **"Only $33 worth of spare parts have been ordered."** But the real story of Pacific's continued use of Wemco Sand Preparation Machines lies in their ability to invariably produce specification materials under all feed conditions. Wemco's slow-speed, multiple-pitch spirals, operating in a large, quiet pool, insure the recovery of the desired fine (150 mesh) sand without a sacrifice in raking capacity. This unbeatable combination of low-operating costs and specification sand spell profits for Pacific on every one of their 8 Wemco units. They can do the same for you.

**Send Wemco your sand problems for profitable solutions.**

**WEMCO®**
**WESTERN MACHINERY COMPANY**

650-K FIFTH STREET • SAN FRANCISCO 7, CALIF.

*Representatives in principal cities of the United States and Canada and in major countries throughout the world.*

# Major copper mine in Arizona

# helps boost production with 2 heavy-duty graders

Building railroad bed, Adams 660 works dumped waste material to edge of bank for casting overside with bulldozer blade.

Said one grader operator, "The Adams is much faster . . . will do twice as much work. Controls are easier, blade visibility better."

At a large open-pit mine in Arizona, ore is mined at low levels and hauled by railroad cars . . . at higher levels, overburden is removed by a fleet of 35-ton trucks. To help these haulers travel at safe, profitable speeds, and to speed road and rail-spur construction — the mine uses two 150 hp Adams* 660 graders.

### Patrols roads 24 hrs. a day, 6 days per week

One of the heavy-duty "660" LeTourneau-Westinghouse units is used primarily for maintaining many miles of haul roads. This fast-moving grader patrols these busy mine roads 24 hours a day, 6 days a week. It goes wherever needed . . . to fill ruts, level washboard, clear debris dropped by overloaded haulers and improve drainage.

For working along steep drop-offs, the Adams' standard blade extends a full 7½ ft. beyond wheel line, to give operator safe working margin. Extra-safe dual-braking system stops transmission as well as tandem drive-wheels for sure, safe stops and minimum brake wear.

### Helps build new roads, RR grades

The second "660" grader — equipped with bulldozer blade — is used on new construction work and for maintaining waste dump. When constructing new roads or railroad beds, the "660" handles all the blade work.

### Works any kind of material

Wide range of speeds give Adams advantage for working efficiently in any kind of material. All 80 to 150 hp Adams graders have an 8 forward and 4 reverse speed transmission. In addition, optional 3-speed "creeper" gears (0.23 to 1.82 mph) may be added. These low, full-power speeds move heavier loads, handle rocky material with greater speed and safety, insure more accurate blade control for fine finishing around forms or obstructions.

Adams' largest grader — the powerful 190 hp POWER-*Flow* 660, with torque converter — gives you an infinite number of speeds forward to 27.4 mph . . . reverse to 24.4 mph. Adams' smallest, the 60 hp "220", has 5 speeds forward to 18.3 mph — best in its class.

### See Adams in action

Why not see how you, too, can step up mine and quarry production, cut operating costs — with heavy-duty Adams graders? There are 6 models: 190, 150, 123, 115, 80, 60 hp. Choice of GM or Cummins engines on 5 larger models. Call or write for a demonstration at your pit.

With dozer blade, "660" maintains waste dump. Over 72% of the total amount of material mined at this copper mine is waste.

Powerful "660" helps build exploration roads and RR road beds fast and easy. Commenting on the Adams grader, the second operator said, "I like the power and weight of the '660'. Also, the big 14-ft. moldboard and wide choice of speeds."

*Trademark G-1483-M-1

**LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

**Where quality is a habit**

Nearly a mile of Armco Special Analysis Steel Pipe carries abrasive phosphate slurry to the processing plant at the Polk County, Florida, location of the Davison Chemical Company, Division of W. R. Grace & Company.

# Save on Hydraulic Materials-Handling Costs **with Durable Armco Pipe**

In dredging, phosphate mining, and similar hydraulic mining operations, pipe replacement takes a big share of the operating budget. Here's why Armco *Special Analysis* Steel Pipe can help reduce this expense.

Armco Pipe provides excellent abrasion resistance and high structural strength. This means long service life . . . lower cost per cubic yard of material handled.

You can easily meet your requirements from the wide range of diameters (6 to 36 inches) and wall thicknesses ($\frac{9}{64}$- to $\frac{1}{2}$-inch) available in Armco Pipe. Ends are machine contracted or expanded on shore pipe for efficient, non-leaking joints. The interior is smooth—free from laps and weld protrusions—for high flow capacity.

Write us for information applied to your specific needs. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 3287 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

## Armco Special Analysis Steel Pipe

ARMCO®

# How to boost pit output... cut handling costs

Short turn radius of Rear-Dumps allows quick spotting in restricted areas. Low rear-entry and wide bowl provide easy target for shovel operator . . . make for fast dipper swing-out, let shovel operator heap maximum yardage without spillage.

The use of modern LeTourneau-Westinghouse Tournapull Rear-Dumps on your pit hauls can cut cycle time, boost production, and lower operating costs. Here's how:

**Greater maneuverability** — Positive electric power steer, through geared kingpin, permits prime-mover to pivot at right angles for short 90° turns. As a result, unit makes continuous U-turn in less space than Rear-Dump's own length. In dump position, it turns in only about ⅔ of overall length!

There's no need for turntables or elaborate turn-around areas. You spot faster at the shovel, dump faster, and get away faster from pit or dump. On the haul, you make hairpin turns with safety — complete cycles faster. Time saved adds up to extra trips per shift, greater production . . . with no increase in manpower or equipment investment.

**Speeds loading** — Low, wide bowl permits shovel bucket to swing in low for faster loading. It permits quick bucket swing-out, even while dipper-door is still open. And because of large target area, spillage is greatly reduced. Production delay during the day for clean-up of pit floor is minimized.

**Dumps fast, clean** — Flick of switch on control panel instantly activates point-of-action electric-hoist motor. Body raises quickly, to desired angle. At full dump position, edge of bowl is low behind rear wheels . . . material cannot roll forward to lodge against wheels, nor pile under rear end. Streamlined body sheds stickiest material readily.

**Resists body shock, damage** — Shovel operator does not have to take it slow and easy when loading. Rear-Dump body is ruggedly built. Simplicity of Tournapull Rear-Dump construction permits using steel otherwise used in frame and sub-frame. In L-W Rear-Dumps this material is used to build greater strength into the bowl itself. Body is all steel — no wood fillers. Floor is lined with heat-treated tool-steel strips, welded to solid billets laid over heavy steel plate.

### Ask for complete information

If you're interested in increased production and lower handling costs, it will pay you to investigate high-production Tournapull Rear-Dumps. 3 sizes: 11, 22, and 35 tons. Write for full specifications.

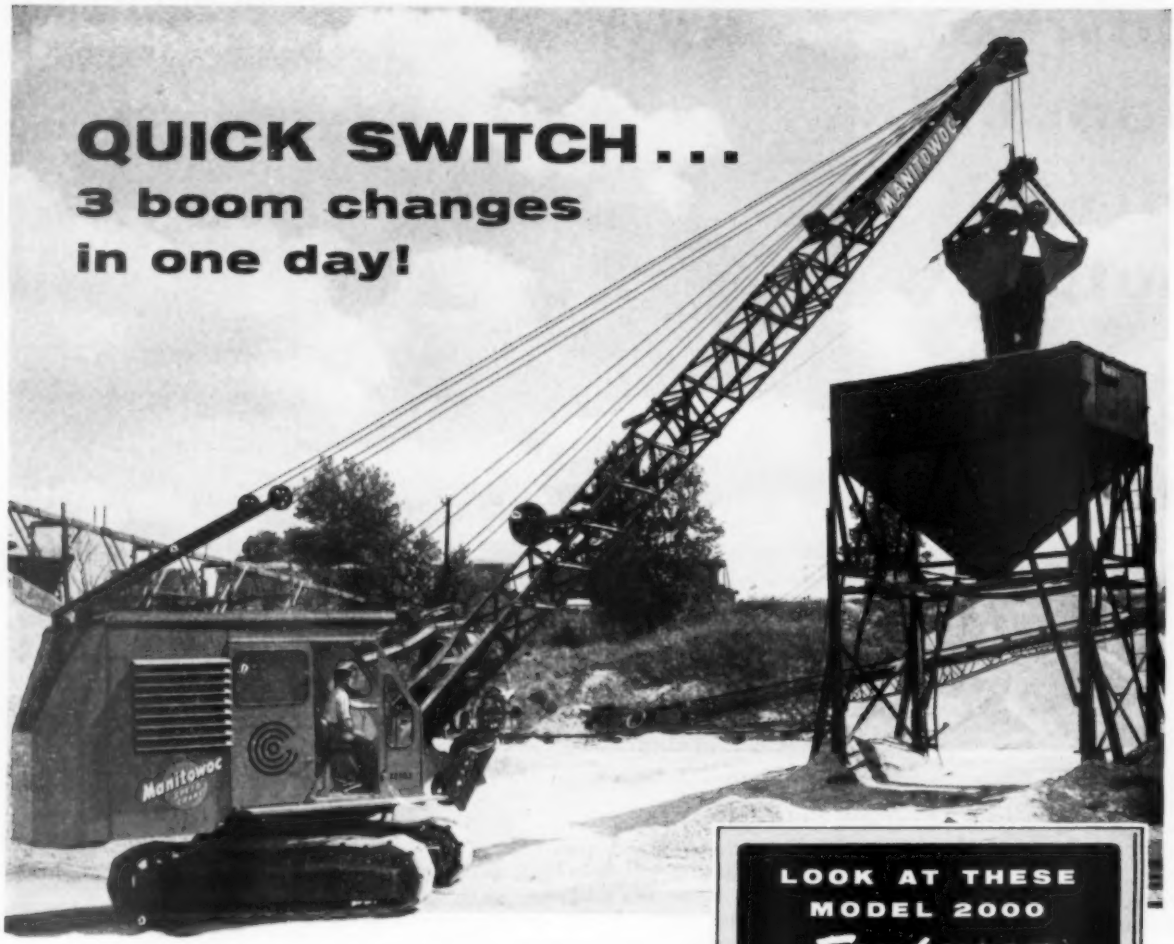
Tournapull—Trademark Reg. U.S. Pat. Off. R-1452-M-1

Big single, low-pressure tires . . . exclusive power-transfer differential . . . and 90° electric wagon-type power steer enables Rear-Dump to safely and steadily haul through muck, rock, and soft fill.

**LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

**Where quality is a habit**




**Chicago Gravel Co. feels that one good Manitowoc deserves another** — that's why the company recently added another Manitowoc Model 2000 Clamshell to move gravel at its Rockdale, Ill., plant. Mr. G. E. Singletary, General Superintendent says, "We purchased this new Manitowoc 2000 Clam because we know we can count on simplicity of design and long operation, without much maintenance. The rig is very easy to convert from dragline to clam and back again. We have changed as often as *three times in one day* to suit some particular operation at hand. The line speed is well-suited for either bucket and the operator likes the machine very much."

Consistent high output is the rule with this rig. The Model 2000 moves 800 to 1000 tons of gravel daily, in addition to dragline excavation, and has put out as much as 1200 tons a day when loading railroad cars. The clam is also used for charging bins with gravel and stockpiling it for future orders.

See why more and more plants and quarries are turning to Manitowoc for increased production and trouble-free performance. Investigate the complete, profitable line of Manitowoc shovels, draglines and clams — available in 1-yd. to 5½-yd. to fit any job you have. Call your helpful Manitowoc distributor today!

Manitowoc Engineering Corp., Manitowoc, Wis.

SHOVELS
1-5½ YD.

Manitowoc

CRANES
20-100 TON

**LOOK AT THESE MODEL 2000 *Features***

- Simple design with only 13 gears and pinions in the entire machine — only working gears turn.
- Exclusive slide pinion arrangement requires only one set of clutches to drive travel, swing and boom hoist.
- Real stability on any ground provided by a massive one-piece carbody mounted directly on crawler frames — long, wide crawlers — scientific weight distribution throughout the rig.
- Fast closing-hoisting line speed is 200 feet per minute with holding line speed even faster at 214 f.p.m.
- Smooth, positive control with plunger drum clutches; disc-type swing clutches; optional torque converter and air controls.

# NEW THOR SELF-PROPELLED ONE-MAN DRILLCAT

## First on-the-job reports prove Drillcat delivers more work, bigger profits, in less time

### CHECK THIS PROOF DIRECT FROM THE JOB

**PAID FOR ITSELF IN ONE JOB**

A net profit of $15,000 in one week on rock drilling jobs was reported by one contractor—another, equipped with five Thor Drillcats paid for them in three months from extra profits.

**SAVES OVER 2½ HOURS SET-UP TIME**

You can set a Thor Drillcat in drilling position—ready to go—in 20 to 25 minutes.

**FAST WHEN THE GOING IS TOUGHEST**

One man on a Drillcat tugged a 600 c.f.m. air compressor ½ mile over rough terrain, drilled five holes and was back with equipment at his starting point in only two hours.

DRILLING TOE HOLES. The Thor Drillcat is completely flexible. The boom and mast are lowered flat to the ground for toe and lifter holes. Twin reversible drive air motors permit easy maneuvering to any position, any angle. (Note position of controls for easy operation.) A "dead man" control for all air valves is standard equipment on the Drillcat.

DRILLING DOWN HOLES. Two 7½ h.p. air motors propel this compact (6 ft. 9 in. overall) Thor Drillcat where no other crawler can go. More than enough power to pull its own air supply. Drilling down holes is no chore for Thor's Drillcat. Using the powerful model 105M drifter and chain feed mast, the hydraulic accumulator keeps boom rigid at all times. This means less steel breakage and less wear on chuck parts.

**These exclusive features make Thor model MM-2 Drillcat the most productive rock-drill you can buy! Ask any Thor distributor for a Drillcat demonstration.**

**● Thor's super-powered 105M drifter rock drill. ● Rugged Thor BW-2 wagon drill mast and air control motor. ● Self-propelled with two 7½ h.p. Eimco air motors, power aplenty to haul itself and air supply. ● Rigid frame, proved in tractor design, no moving or wearing parts, long lasting, low maintenance. ● Aircraft-type accumulator in hydraulic system absorbs shock. ● Simple hand-operated track take-up. No tools required. No track locks required. ● Large flat platform. Ideal for operator when drilling toe holes, good for tool and fuel storage.**

Thor
PORTABLE POWER
TOOLS

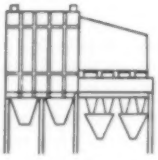
**THOR POWER TOOL COMPANY**
PRUDENTIAL PLAZA, CHICAGO
*Branches in all principal cities*

# How to tame a dust collection problem

Look for the 'hidden' factors that deliver important *extra efficiency,* like the exclusive Shave-off in Buell Cyclones that harnesses the double-eddy currents to trap an extra percentage of dust. Side-entry of gases, Buell-designed manifolds, proper proportioning, extra-heavy-plate construction provide even more efficiency. Send for the ready reference booklet, "The Collection and Recovery of Industrial Dusts". Dept. 18-I, Buell Engineering Company, Inc., 70 Pine Street, New York 5, New York

BUELL CYCLONE

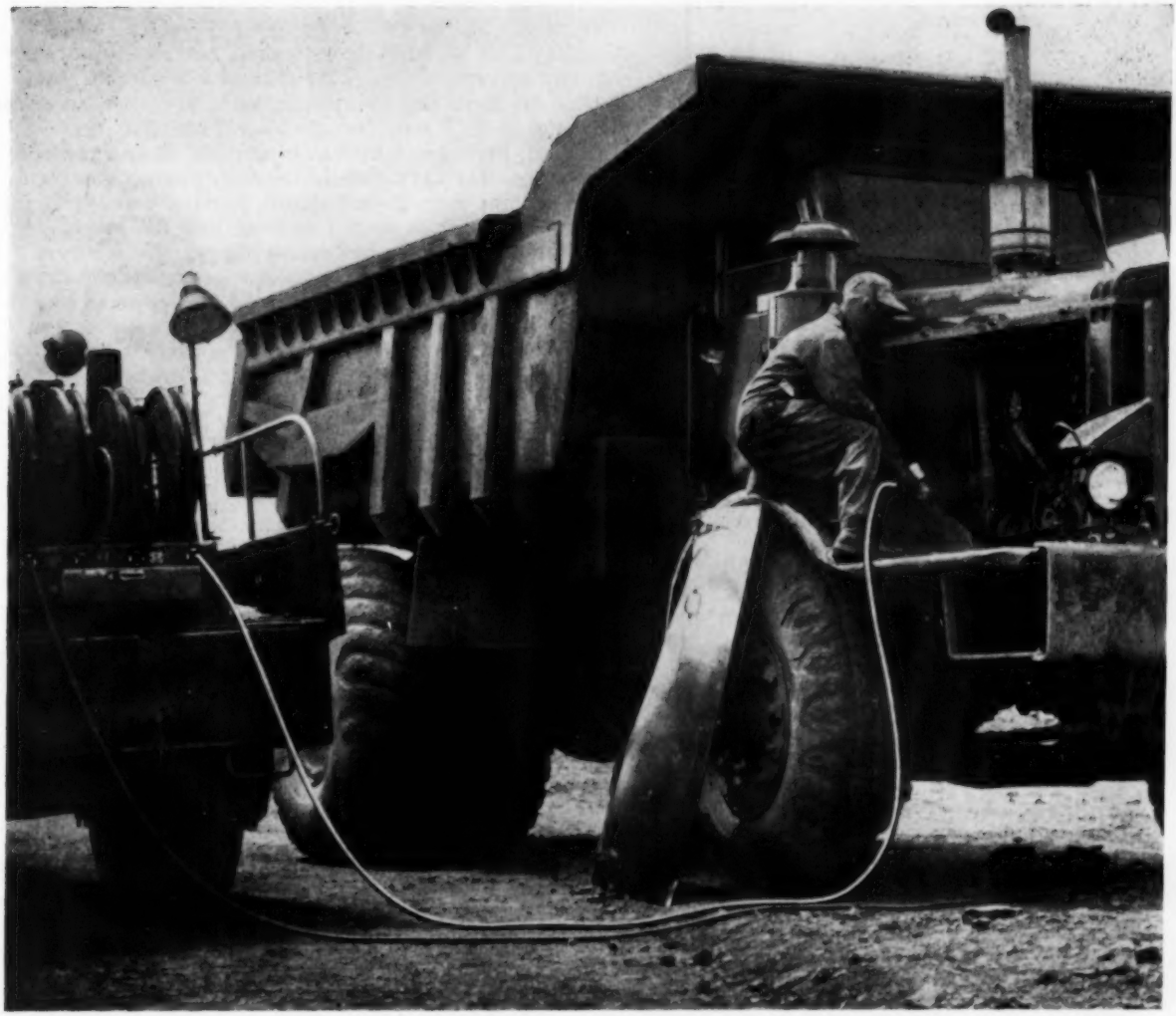
"SF" ELECTRIC PRECIPITATOR



PRECIPITATOR-CYCLONE COMBINATION

buell®

*Experts at delivering Extra Efficiency in* **DUST COLLECTION SYSTEMS**



# Fights Deposits!

Keep out power-robbing deposits in your heavy duty Diesels. Refill with Sinclair SUPER TENOL® for the tough jobs! It helps to eliminate deposits of carbon, varnish and sludge that impair engine efficiency. SUPER TENOL is specially engineered to fight the effects of high temperature, engine over-load and continuous stop-and-go operation. Your engines last longer!

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

**SINCLAIR**

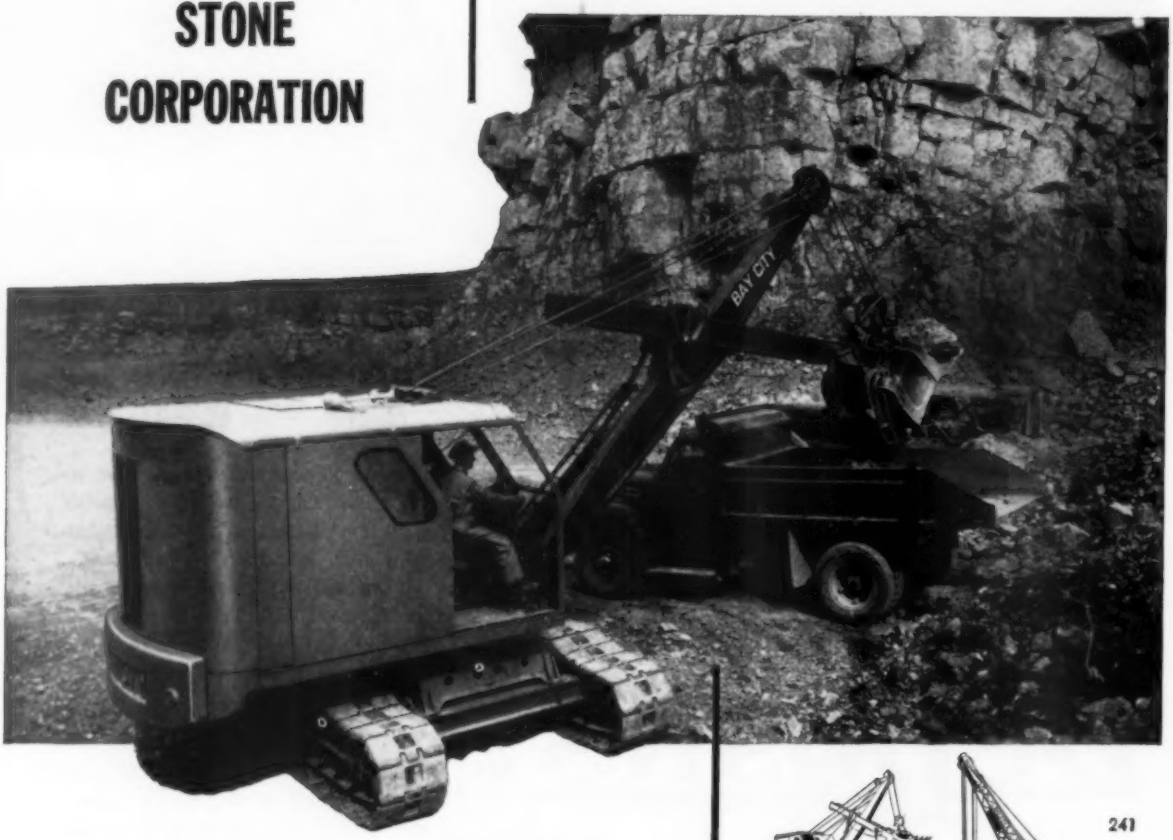
**SUPER TENOL MOTOR OIL**

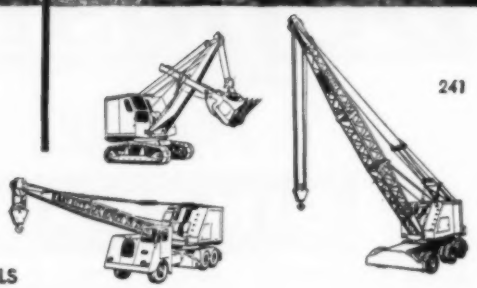
# BAY CITY

## ¾-YARD SHOVEL handling 800-1000 tons blasted rock per day for the CATSKILL MOUNTAIN STONE CORPORATION

"Our BAY CITY Model 45 shovel with ¾-yard rock type dipper not only averages 800 to 1000 tons of blasted rock per 10-hour day in feeding the crusher, but it also sorts out stones weighing up to 6 tons for secondary blasting," says Mr. W. H. Peckham, President of Catskill Mountain Stone Corporation. BAY CITY doubled the daily production over a former light duty ¾-yard shovel, proving once again that for heavy duty work there's nothing like the tough, powerful BAY CITY. It has double dipper sticks, 3-part line, a 6-foot rotating path, helical cut gears, separate shafts and bearings for each hoist drum, and it is powered by a big 517 cubic inch Waukesha engine. These specifications compare favorably with many 1-yard shovels. Get complete information on the BAY CITY 45 from your BAY CITY dealer.

*Write for these catalogs describing* BAY CITY *Crawlers of ½ yards and up,* BAY CITY *CraneMobiles and CraneWagons in capacities to 25 tons.*




# BAY CITY

**BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN**

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

# GENERAL NYGEN® TIRES

## SPEED UP MOVING 6-MILLION YDS. OF DIRT FOR ALLEGHENY CONTRACTING INDUSTRIES ON HUGE $153-MILLION INDUSTRIAL DEVELOPMENT!

Here, as on thousands of other construction jobs, General Nygen Tires are proving that superior strength *plus* crawler-like traction and flotation, gets the job done faster and *for less!*

Built with exclusive stronger-than-steel Nygen Cord and featuring extra wide, extra deep treads, Generals are unequalled for deep-down drive and dependability.

Hand General Nygen Tires your toughest assignment today and watch them save time . . . build profits!

**THE GENERAL TRUCK TIRE**

*specify* GENERALS *on your new equipment*

**THE GENERAL TIRE & RUBBER CO. • Akron, Ohio**

## Riddle Quarries Cut Costs with

# MURPHY DIESEL POWER

**"70% lower maintenance**
**15% lower fuel costs**
**12% higher production"**
**says JOHN H. RIDDLE**

Murphy Diesel's ability to cut maintenance and fuel costs, and help increase production, is an important item on any construction job. *But that's not all John Riddle likes about his Murphys!*

"We purchased Murphy," he says, "because our experience with some second-hand, smaller Murphy engines demonstrated that Murphy starts easier, runs cooler, delivers steadier, more uniform power at more economical operation costs, with added reserve for excess demands. We found this engine to be free of ordinary breakdowns, and capable of delivering long trouble-free service even through 20-hou. shifts."

Riddle Quarries, of Salina, Kansas, has 4 shovels, 3 secondary and 1 jaw crusher primary plant, all powered by Murphy.

Ask your Murphy Dealer about the advantages of Murphy power on your job.

*Four of Riddle Quarries' 8 Murphy Diesels power both shovels and the portable primary and secondary plants used to furnish blanket and rip rap material to the U. S. Bureau of Reclamation on the Lovewell Dam.*

377RO

MURPHY DIESEL

**HEAVY-DUTY POWER for Rock Crushing**

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

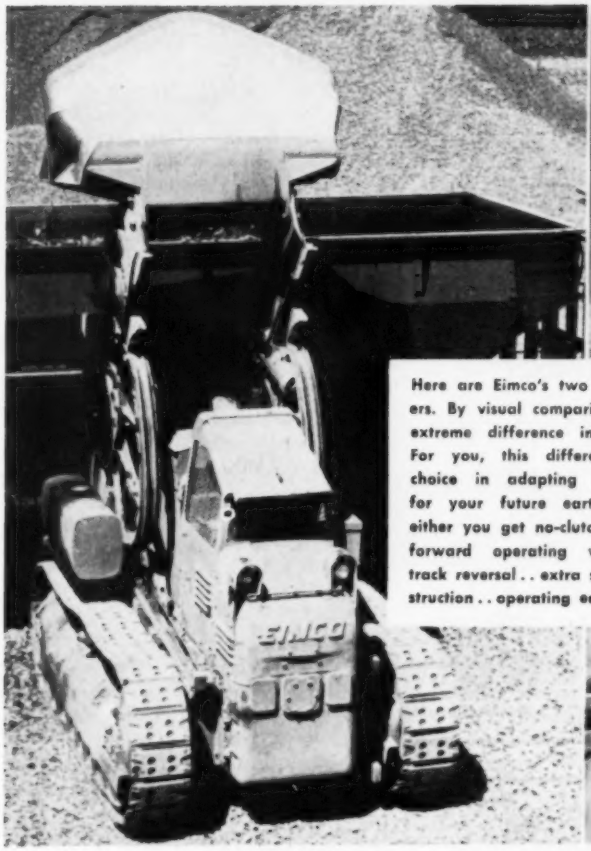
## MURPHY DIESEL COMPANY

**5307 W. Burnham St., Milwaukee, Wisconsin**

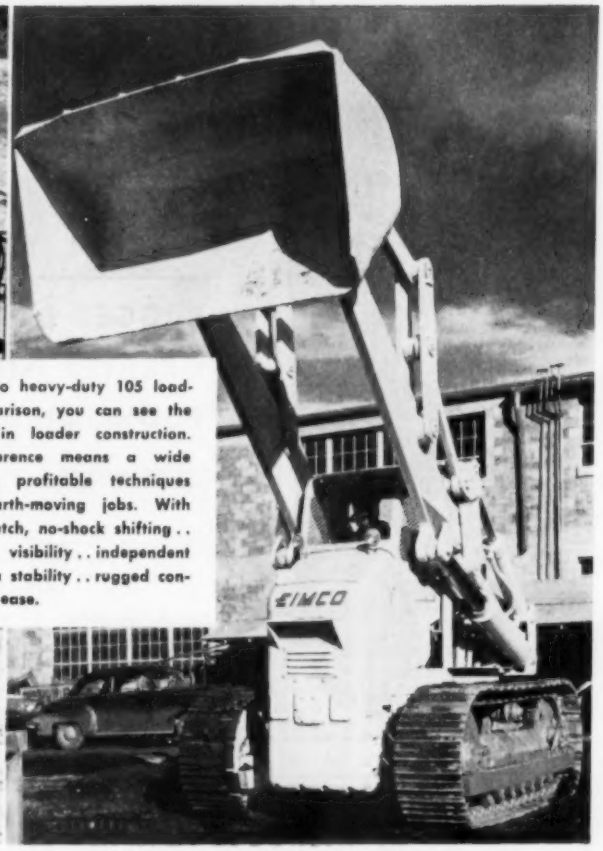
SALES . . . PARTS . . . SERVICE

Throughout the Nation

# ONLY EIMCO...OFFERS YOU THIS LOADER SELECTION




EIMCO 105 EXCAVATOR




EIMCO 105 FRONT-END LOADER

**Here are Eimco's two heavy-duty 105 loaders. By visual comparison, you can see the extreme difference in loader construction. For you, this difference means a wide choice in adapting profitable techniques for your future earth-moving jobs. With either you get no-clutch, no-shock shifting . . forward operating visibility . . independent track reversal . . extra stability . . rugged construction . . operating ease.**

**THE 1½ YARD EIMCO EXCAVATING LOADER** can dig and load rock and other tough materials on a comparable basis with boom-type equipment many times more costly. The bucket travels overhead to discharge, providing an operating cycle of 10 to 12 seconds. With 39,000 lb. digging force and "high leverage" rocker arm contour, it digs fast . . even in tough clay, hardpan, shale, glacial till, etc.

The Eimco 105 Excavator is especially adapted to all types of tunnel excavating . . loading blasted rock or overburden on narrow benches . . removing material on highway projects without blocking the motorist by-pass lane . . and many other applications where ability to load without turning is convenient and saves time. Spot trucks close behind and your Eimco 105 operator will keep haulage equipment working at a maximum pace every hour.

Write for Bulletin L-1048 today!

**THE 2½ YARD EIMCO FRONT-END LOADER** with 40,000 lb. break-out is an extremely flexible heavy-duty loader — ideal for digging off high banks . . handling fine, dusty or wet material . . dicharging into any size trucks spotted on a higher elevation . . cutting smooth grades where strong downward pressure is needed . . razing . . bulk loading . . and many other applications. Dozer blades, fork lifts and other attachments are readily fitted to this loader. It operates in 9' 6" headroom . . can reach over a 14' bin, hopper or gondola to discharge its cargo.

The loader mechanism operates at high mechanical efficiency and has many exclusive hydraulic system protective features. Combine this with extreme 105 tractor mobility and you get an earthmover that will make more trips every hour . . stay on the job longer . . get greater total production than competitive front-end units.

Write for Bulletin L-1050 today!

**THE EIMCO CORPORATION**

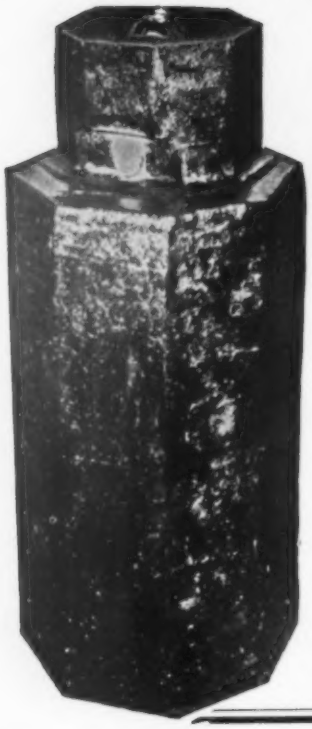
**Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City**

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Pittsburgh, Pa. Seattle, Wash.
Cleveland, Ohio Houston, Tex. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-282

# "No. 1 ROCK BUSTER"

**specially designed for QUARRY OPERATIONS**



**"Cape Ann" FORGED STEEL DROP BALL**

- RUGGED DESIGN
- GREATER IMPACT
- ECONOMICAL

Used and approved by leading quarrymen everywhere, the "Cape Ann" Drop Ball is available in weights from 2000 to 12000 lbs.

It has a forged connecting link, protected by deep recess, for swivel or shackle. Strong alloy steel pin. Low cable replacements. Furnished complete as shown.

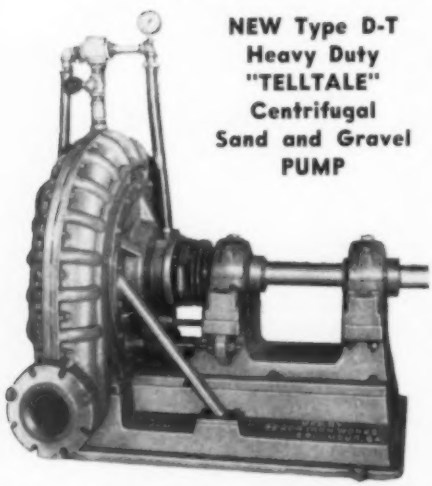
*Write Today for full details*

**Cape Ann Anchor & Forge Co.**

Gloucester • Massachusetts

# A LONE COMPLAINT IN A PUMP'S FIRST YEAR

**NEW Type D-T Heavy Duty "TELLTALE" Centrifugal Sand and Gravel PUMP**



Fred Girod, Vicksburg, Miss. telephoned: "How can I reduce my pump's production? My screen and washer can't take it."

The Taylor Sand Company's 8" pump at Junction City, Ga. is loading five, frequently six, 60-ton cars of sand per hour.

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signal that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy Duty folder and prices.

**PEKOR IRON WORKS, INC.**

*ESTABLISHED 1892*

LOCK DRAWER 909 COLUMBUS, GEORGIA


Contracts for the second phase of construction of the Owens-Illinois Glass Company plant at San Jose de las Lajas, Havana, Cuba, have been awarded to two Cuban firms.

John L. Gushman, president of Owens-Illinois de Vidrios de Cuba, S. A., said the contract for the additional work on the three-furnace plant was awarded to Fernando Munilla of Havana. The second contract, for construction of the 4,200-ft. siding connecting the plant with the Occidental Railway, was awarded to Jose A. Reguerra of Havana.

Work on the plant was begun last summer, with completion expected early next year. The plant will be capable of producing about 72,000,000 glass containers, drinking glasses, and bottles and jars for the packaging of foods, beverages, and drugs.

---

Appointment of ALEXANDER F. DURAND as manager of new distribution for the General Tire & Rubber Company, Akron, Ohio, was announced.

Durand's new duties will be in addition to his responsibilities as director of sales training. He will continue to headquarter in Akron.

Joining General Tire in 1949 as a territory manager, he was promoted to car dealer sales manager for the New York division, to Boston division passenger tire sales manager in 1955, and to sales training director in 1956.

---

Two new dealers have been appointed to sell and service the Michigan line of tractor shovels, tractor dozers and excavator cranes, products of the construction machinery division of Clark Equipment Company, Battle Creek, Mich.

Dealers and their territories are: Fuchs-Clayton Machinery Company, Omaha, Neb., in the following Iowa counties: Lyon, Osceola, Sioux, O'Brien, Plymouth, Cherokee, Woodbury, Ida, Monona, Crawford, Harrison, Shelby, Pottawattamie, Cass, Mills, Montgomery, Adams, Fremont, Page and Taylor; and Nebraska counties west of and including Knox, Pierce, Madison, Stanton, Colfax, Butler, Seward, Saline and Jefferson.

The Island Supply Co., Grand Island, Neb., will serve Nebraska counties east of and including Cherry, Grant, Arthur, Keith, Perkins, Chase, and Dundy, and west of and including Boyd, Holt, Antelope, Boone, Platte, York, Fillmore and Thayer.

Wobbler in quonset-type structure feeds oversize to spoils pile. Fines go to screens and conveyors.

## The UNIVERSAL WOBBLER has

# cut our grizzly maintenance from 2 days a week to 4 hours a month

**Says Jack Harrington, Plant Engineer, Thomas Connelly Co., Hammond, Indiana**

"We handle daily about 6400 tons of open-hearth and blast-furnace slag—reclaiming the iron and processing the rest with screens and crushers.

"Up 'till November, 1956, we used a bar grizzly to separate fines from oversize ahead of the screens. With the grizzly we had to use one of our cranes full time to keep the bars cleaned off. This meant a loss of $3500 a month we could have been getting in rental money on the crane.

"So we replaced the grizzly with a Universal Wobbler Feeder and it's been a big improvement. It not only freed the crane but cut down our previous maintenance time to four hours a month.

"With the grizzly, we had two days welding time a week. So far, we don't see any wear on the Wobbler. This machine has handled more than half a million tons of slag for us—and before that, about a third of a million tons of granite. It's doing a swell job."

Harrington is talking about a real brute for punishment. The Universal Wobbler Feeder takes 60-ton dump loads all day for the Thomas Connelly Company. Self-hardening manganese steel bars resist wear—get tougher with use.

If you're in slag, cement, mining, quarrying, aggregate production or heavy, non-building construction, this machine has a record of proven performance that will interest you.

The Universal Wobbler has no equal in a heavy material handling job. It moves material and separates fines—a combination feeder-scalper that won't clog even in wet, sticky material. A wide range of sizes in different alloys are available to remove fines from 6" down to ½".

This is an ideal unit for increasing the capacity of primary or secondary crushers. We'll furnish users names on request and discuss your feeding, scalping and crushing problems at no obligation.

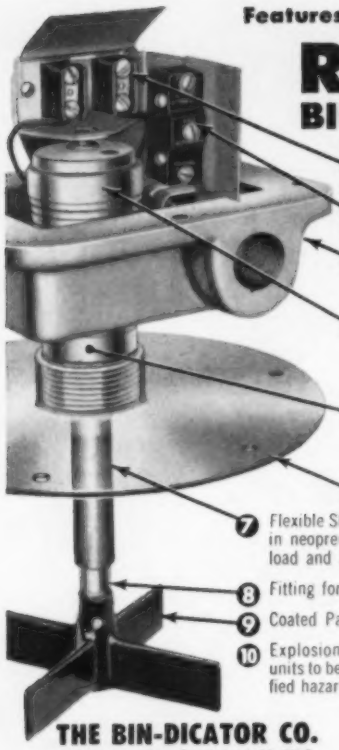
Tell us the kind of material to be handled, the percentage of fines in the feed, size of fines to be removed and the desired capacity in tons per hour.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

**UNIVERSAL ENGINEERING CORPORATION**
**619 C Avenue N.W., Cedar Rapids, Iowa**
Subsidiary of Pettibone-Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

Features of the Improved

**ROTO-BIN-DICATOR**



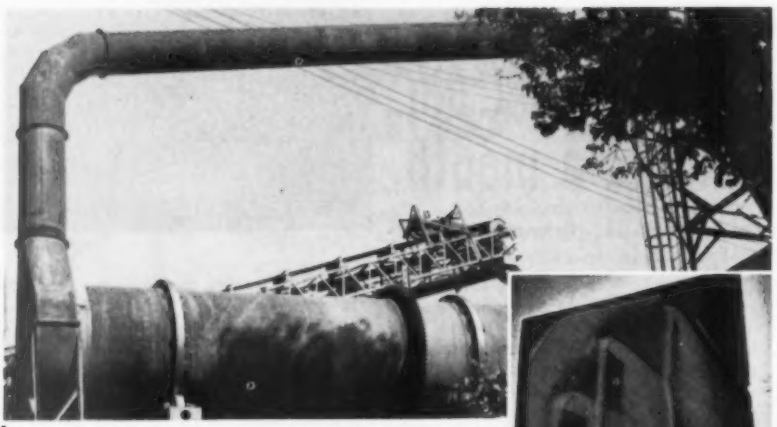
1. H.D. Terminal Block; easy connections.
2. Micro Switch for control circuit.
3. Dust-tight gray iron housing; std. or exp. proof.
4. Low Torque Motor supported on 2 bearing points for protection from vibration.
5. Precision Ground Drive Shaft; packed ball bearings for H.D. operation.
6. Mounting Plate 8" dia.
7. Flexible Shaft; heavy coil spring molded in neoprene for long life under heavy load and abrasion.
8. Fitting for easy shaft extension
9. Coated Paddle resists abrasion.
10. Explosion-Proof Models; first and only units to bear U.L. Label for use in specified hazardous atmospheres.

**THE BIN-DICATOR CO.**
13946-T Kercheval • Detroit 15, Mich.

*Write for Bulletin BD-8C. or call*
VAlley 2-6952

**WE SELL DIRECT • PHONE ORDERS COLLECT**





▲ TOP: This 7'-0 x 30'-0 rotary dryer removes excess moisture. Dryer is oil heated.

RIGHT: The lifters, with their unique cup-like design and their staggered arrangement in the unit, cause the sand particles to be evenly distributed and greatly increase the capacity and efficiency of the dryer. ▶

A McDermott Dryer Installation at the North American Refractories Plant at Little Gap, Pa.

Sound Engineering Economy and Consistently Superior Performance Are Built Into All McDermott

***Dryers • Coolers • Kilns***

**McDERMOTT BROS. CO.**
Allentown Pennsylvania
Phone HEMLOCK 3-3231


The board of directors of the General Tire & Rubber Company approved a proposal to split the company's common stock three-for-one.

The proposal is subject to the approval of General's common stockholders. If approved, the split will increase the number of authorized shares from 2,500,000 to 7,500,000.

The board also declared a cash dividend on the present common stock at the rate of 50 cents per share, which was payed on August 30, 1957 to holders of record at the close of business on August 16, 1957, and stated that its present intention was to pay quarterly dividends commencing with the next dividend on the new common stock at the rate of 17½ cents per share.

---

The B. F. Goodrich Company, Akron, Ohio, has purchased 125,000 sq. ft. of land in New Orleans, La., and will construct a modern distribution center on the site. The building, to cost approximately $400,000, will be under construction soon.

The new center with 55,000 sq. ft. of floor space will house company offices, warehouse facilities for tires and industrial products, and a tire recapping plant.

---

Joseph T. Ryerson & Son, Inc., warehousing subsidiary of Inland Steel Company, has opened a $1,000,000 steel service plant in Indianapolis, Ind.

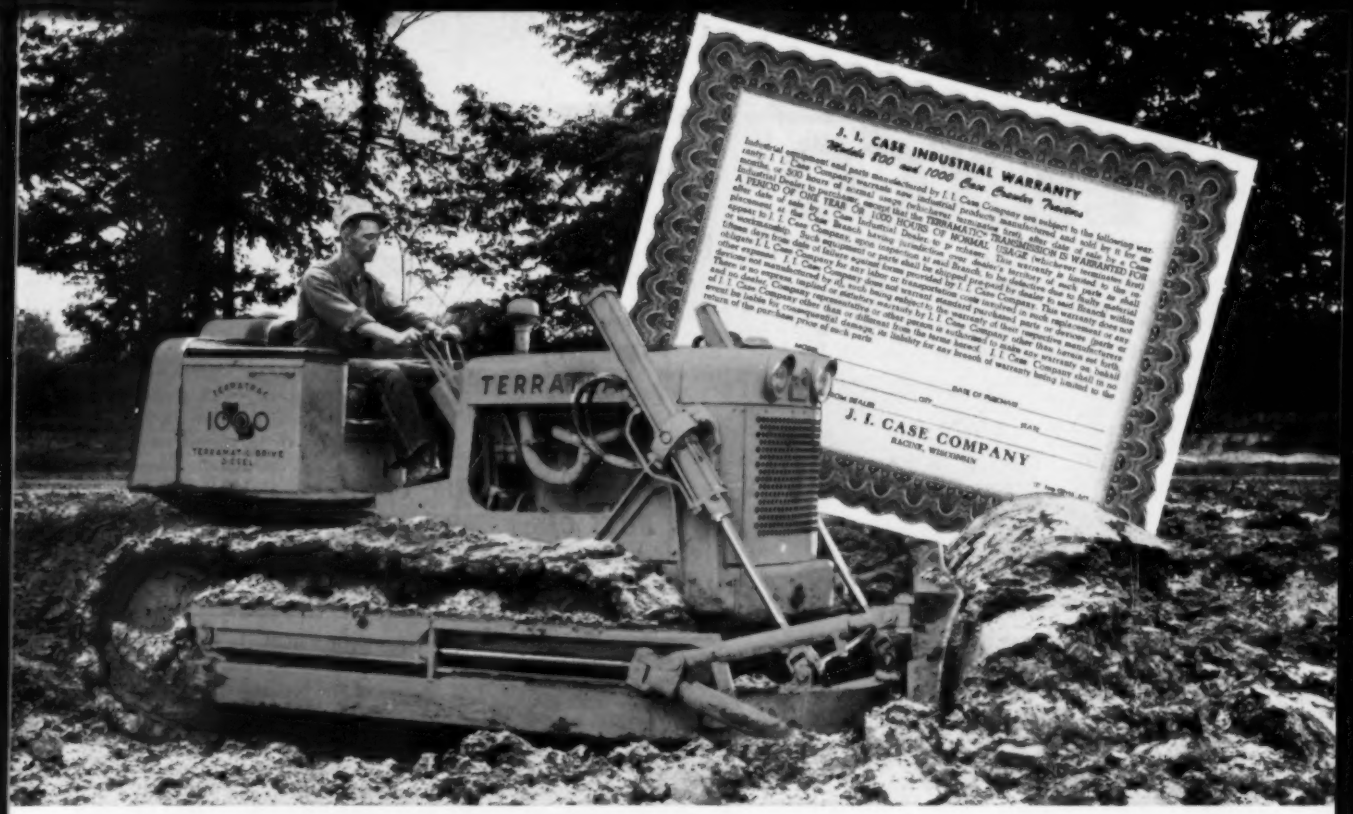
Stocks of bar, structural, plate, sheet, and tubular steel will be stored in the aluminum-sheathed warehouse, which will be heated in winter to protect special finishes on steel. Air conditioned offices are in a two-story brick building adjoining the plant.

Key personnel at the new plant are Robert L. Larson, general manager; Fraser Martin, superintendent; Thomas P. Powers, inside sales manager; Richard C. Miller, credit-office manager; and Lawrence N. Weiberg, manager of merchandise inventory.

---

The Caterpillar Tractor Company of Peoria, Ill., has received a $5,000,000 contract for motor graders from the Chicago Procurement Office, Army Corps of Engineers.

The contract calls for 328 No. 12 motor graders, plus 95 airborne No. 933 Traxcavators and 25 airborne D6 tractors. The equipment will be delivered by early 1958.




# *Announcing new*

# ONE-YEAR WARRANTY

## on the sensational Terramatic transmission

Here is really *terrific news* for tractor-users everywhere! Because of the outstanding performance of the new higher-speed 80 and 100 HP Case® TerraTrac® crawler tractors, Case has DOUBLED the warranty on its counter-rotating Terramatic transmission — *from 6 months to a full year* — on all new machines shipped after July 15, 1957. This means that you can now purchase a torque-converter-equipped Model 800 or 1000 Case TerraTrac crawler with the assurance that you are getting the *finest transmission and the most liberal service warranty in the tractor industry today.*

Biggest advantage of the counter-rotating Terramatic transmission is that it gives you *much faster working speeds and greater ease of maneuverability* than you ever dreamed possible with a crawler tractor. Simplified hydraulic controls let you shift on-the-go . . . turn "on a dime" . . . as smoothly and easily as driving the most modern passenger car. Result: *Operators can do twice as much work, with about one-tenth the effort.*

Best of all, these highly-maneuverable Model 800 and 1000 Case TerraTrac crawlers are available with a full range of advance-design equipment — including high-dump tractor-shovels *up to 2-cu. yd. capacity,* plus heavy-duty dozer blades that tilt or angle *hydraulically* — right from the operator's seat. Get the complete story today direct from your nearest Case Industrial Dealer.

CASE

1st in quality
for over 100 years

*Clip . . . mail for free catalog*

**J. I. CASE CO.,** Dept. J1147 Racine, Wis., U.S.A.

☐ Send catalog on Model 800 and 1000 crawler tractors
I am most interested in ☐ Bulldozers ☐ Angledozers ☐ Loaders

Name ..... Title .....
Company .....
Address .....
City ..... State .....

CT-D-75

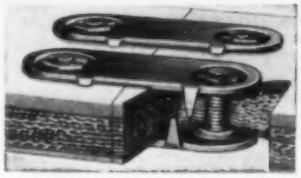
**Industrial Wheel and Crawler Tractors • Loaders • Dozers • Backhoes • Engines**

# FLEXCO®

## BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



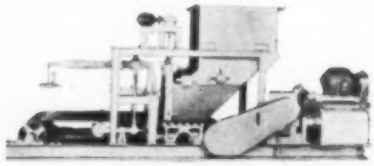
*Compression Grip distributes strain over whole plate area*

*Order From Your Supply House. Ask for Bulletin F-112*

**FLEXIBLE STEEL LACING CO.,** 4623 Lexington St., Chicago 44, Ill.

## The "KEYSTONE" of Efficient Scaling

# SCHAFFER POIDOMETER



## OVER 1500 NOW SERVING INDUSTRY

**Leading bulk material processors install SCHAFFER Poidometers to provide unmatched dependability in the scaling department.**

**These widely used, automatically operating machines combine speed and accuracy in weighing, blending, feeding, mixing, recording and proportioning.**

**Poidometers are finely engineered and sturdily built for many years of continuous, economical service. They reduce production "bottlenecks", and maintain high-level product uniformity.**

**Available with remote control weighing and recording devices, and total weight recorders.**

*Write for CATALOG No. 5*

**SCHAFFER POIDOMETER CO.,** 2828 Smallman St., Pittsburgh 22, Pa.


American Cyanamid Company of New York, N. Y., has signed an agreement with the Illinois Powder Manufacturing Company, producer of industrial explosives, providing for the sale of Illinois Powder business and assets to Cyanamid.

The transaction is subject to the approval of Illinois Powder stockholders. Under terms of the agreement, Illinois Powder stockholders are to receive 88,000 shares of Cyanamid's common stock and the powder firm will become a part of the explosives department of Cyanamid's organic chemicals division.

The Illinois Powder Company's executive and sales offices are in St. Louis, Mo.; plants in Grafton, Ill., and Gomex, Utah, and operates more than 50 magazines in 24 states.

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Promotion of A. L. DASSLER from assistant chief engineer to chief engineer of the Koehring Division, Milwaukee, Wis., has been announced. Mr. Dassler will supervise the design of Koehring's complete line of shovels, hoes, draglines, and cranes. He will also be responsible for engineering developments on other Koehring Division developments on other Koehring Division producets, including the *Dumptor*—an off-the-road hauling unit, a slurry pump called the *Mud-Jack*, longitudinal finishers, concrete mixers, and *Twin-batch* pavers.

KENNETH JOHNSON has been named to the post vacated by Mr. Dassler. Mr. Johnson has been a member of the Koehring organization since 1949.

---

Ground has been broken recently for the Link-Belt Company's $5,000,000 bearing plant in Indianapolis, Ind. The modern plant will increase the capacity of the company's present Dodge plant by 50 percent. Construction is expected to be completed in 1958, and full production of anti-friction bearings is expected by 1959.

---

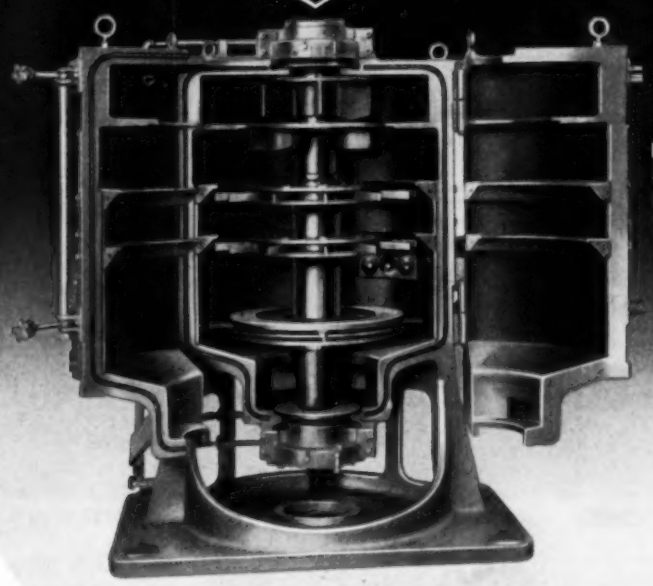
Dominion Brake Shoe Company, Ltd., has acquired all the physical assets and business of Manitoba Foundries and Steel, Ltd., in a cash transaction. The purchase price was not disclosed.

A. C. Montgomery will continue as manager of Manitoba Foundries which becomes the sixth division of Dominion Brake Shoe, a subsidiary of American Brake Shoe Company. Manitoba Foundries was a wholly-owned subsidiary of Vulcan Iron and Engineering, Ltd.

# RAYMOND VERTICAL MILL

SINGLE VERTICAL ROTOR SHAFT CARRIES FAN BLADES, SWING HAMMERS AND REVOLVING WHIZZERS

SIMPLE DESIGN: NO GIMMICKS, NO COMPLICATED ADJUSTMENTS, AND NO CLOSE CLEARANCES.



HINGED DOORS OPEN FULL WIDTH FOR COMPLETE ACCESS TO THE GRINDING CHAMBER

PRECISION CONSTRUCTION

WHIZZER SEPARATION

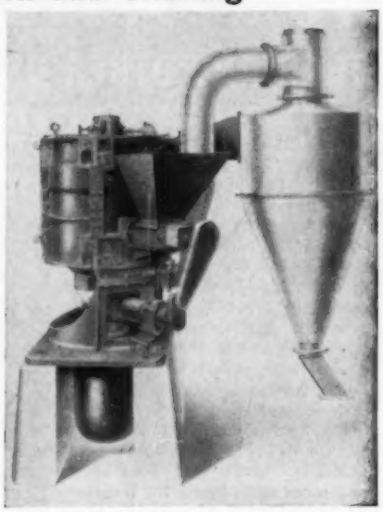
## Wide Open Accessibility for Every Inspection and Cleaning

*Superfine Pulverizing with a Simplified Grinding Unit*

This modern Raymond Vertical Mill is a straightforward commonsense design that combines top performance with easy control, and provides quick accessibility that reduces down-time to a minimum in making new set-ups or adjustments. By loosening a couple of star nuts, the doors can be swung open to expose the complete interior with all the working parts in a matter of seconds.

This specialized unit excels in the grinding of non-abrasive materials to extremely high fineness ranging from minus 325 mesh into the subsieve sizes. On some of these softer materials, finished products in the range of 95% to 98% finer than 5 to 10 microns are commonly produced on this mill. It is likewise very effective in pulverizing tough, hard-to-reduce and fibrous products where close fineness control is required.

*Write for Bulletin No. 78, which describes two sizes: the 18" and 35" Vertical Mills.*



Exterior View of the 35" Raymond Vertical Mill. Interior shown at top.

**COMBUSTION ENGINEERING, INC.**

*Raymond Division*

1321 North Branch St.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

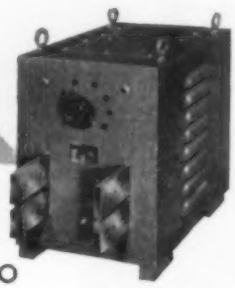
Combustion Engineering-Superheater Ltd., Montreal, Canada

**Is it worth 15¢ an hour to get rid of all the trouble you're having with blinded screens?**

HEAT SCREENS ELECTRICALLY for 15¢ an hour and produce 50% MORE! They do it at a limestone plant in northwestern Ohio, and we will gladly send you a report on the single and double deck screen installations there. See how you can save screen cloth, stop carryover of fines, control quality and keep your screens running at full capacity. Ask for our "50% MORE" bulletin.

any screen now in use can easily be equipped for efficient low-voltage resistance heating with

**CONVERTA-SCREEN**
**TRANSFORMER KITS**



**SCREEN HEATING** *Transformers*
INCORPORATED
428 Erie St. South • MASSILLON 81, OHIO

**40% FASTER THAN ANY OTHER DRILL**

• The McCarthy Vertical Auger Drill cuts drilling time in earth, clay, compacted sand and gravel, hard pan, shale, sandstone and rock as much as 40%. Rugged construction permits you to drive 2 to 24-inch augers to depths of as much as 125' faster than any other drill. Get the facts on the powerful McCarthy today. See how you can complete shot hole, exploration drilling, foundation holes, dewatering operations, well drilling, highway construction and heavy contract work faster than ever before. The versatile, vertical McCarthy gives you more than any other drill. Write for Bulletin M-100 now. Let us show you how you can turn new profits on your drilling job.

McCarthy Vertical Auger Drill Model 106-24

MANUFACTURED BY
**THE SALEM TOOL CO.**
1901 S. Ellsworth Ave., Salem, Ohio


Ritter-Lieberman, Inc., will become the Traylor Engineering and Manufacturing Company advertising agency beginning October 1, 1957.

Traylor manufactures mining and processing machinery including gyratory crushers, rotary kilns, jaw crushers, feeders, and grinding mills.

---

Acquisition of the Tyson Bearing Corporation, Massillon, Ohio, by SKF Industries, Inc., Philadelphia, Pa., manufacturer of ball and roller bearings, was announced recently by Edwin R. Broden, SKF president. The new division, known as the Tyson Bearing Company, division of SKF Industries, Inc., manufactures tapered roller bearings.

SKF maintains its general offices and two plants in Philadelphia. Other plants are located in Hornell, N. Y., and Shippensburg and Altoon, Pa.

A Stewart Murray, president of the Tyson Bearing Corporation since 1955, will continue as president of the new division.

---

The Chicago Eye Shield Company has moved into its new and larger quarters at 2727 West Roscoe, Chicago, Ill.

The new plant, with 50 percent more productive area than the older one, will enable the company to increase production considerably.

Founded in 1903, CESCO has developed many types of industrial protective equipment. At present it offers a complete line of head and eye protective equipment.

---

The Advertising and Public Relations Division of Leeds and Northrup Company has moved its Philadelphia office to 4901 Stenton Avenue, Philadelphia, Penn.

---

R. F. STEWART was elected vice-president of the Western Precipitation Corporation, Los Angeles, Calif., at a meeting of the directors.

After joining Western Precipitation in 1946, Mr. Stewart served as sales engineer in the New York office. In 1951 he was assigned to the Los Angeles offices as assistant chief estimator. He was later named chief contract engineer, and in 1955 assumed the position of sales manager of the firm's Precipitator Sales Div. In this capacity he is responsible for all sales of Cottrell electrical precipitators, multiclone, mechanical collectors, CMP units, and Dualaire Reverse-Jet dust collectors.

DISCOVER

# DAVIS

THE EQUIPMENT THAT LEADS THE WAY

*Another Davis First . . . Low-Cost, Completely Detachable Truck-Mounted Back-hoe.*

*The Davis Back-hoe, Running Mate to the Davis Loader, Can Work at Right Angles.*

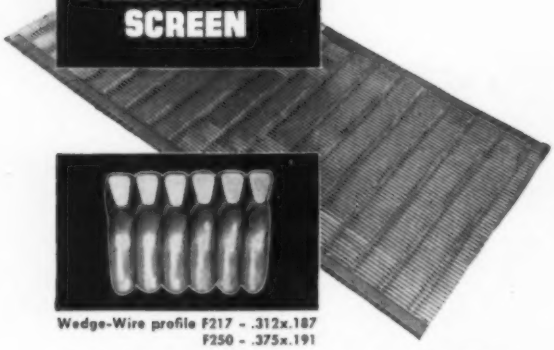
## FOR MORE PRODUCTIVE *LOADING TIME*

There's a reason why the man with a Davis Loader gets more work done... that's because the Davis Loader is designed to handle more jobs, and handle them easily and efficiently. Its widely copied "step-in" design... so popular that others have been forced to adopt it... is just one of the many features. Rugged construction, built to take the hard jolts and requiring less maintenance is another. Streamlined design gives maximum visibility and maneuverability. Little things, too, like an oil filter (standard only on Davis) and centralized hydraulic system, add up to make it your best loader buy whether you look at it from a dollar value or from a performance standpoint. Compare it, you'll agree. And don't settle for second best. Insist upon Davis.

*Available for most popular makes of tractors and from better dealers in the United States and Canada. Write for literature and dealer's name*

**MASSEY-HARRIS-FERGUSON, INC.**
**INDUSTRIAL DIVISION**
1009 S. West St. Wichita 15, Kansas

new !
"LARGE SIZE WIRE"
Kleenslot
PREPARATION SCREEN



Wedge-Wire profile F217 - .312x.187
F250 - .375x.191

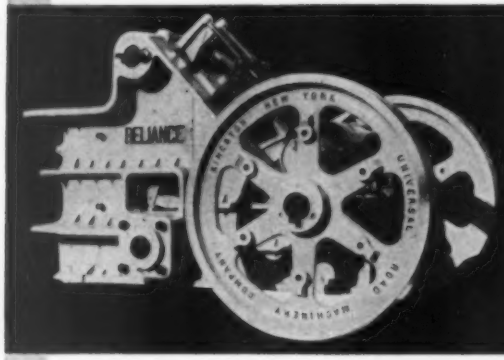
. . . for dewatering, screening, washing, extracting, filtering or sizing. Designed for extended life in abrasive applications. Easily maintains openings from ½ inch to as close as 1 m.m. Exclusive *Independent Flexing Action* provides greater screening capacities. Adaptable to vibrator applications. Available in many metals. Furnished in guard bars and special shapes or designs. Write for prices and details—send your specifications.

WEDGE-WIRE CORPORATION
Wellington, Ohio

ROCK CRUSHERS

LEVER-TYPE JAW CRUSHER STILL IN USE AFTER 36 YEARS

—at Keystone, So. Dakota




You, too, will do better with a HEAVY-DUTY RELIANCE lever-type crusher

- Greater weight, more stability—you save money on upkeep.
- Minimum abrasion—outlasts other designs 3 and 4 to 1.
- Long jaw plates—adjustable for all fineness ranges.
- Crushing, screening and washing plants—50 to 1,500 tons-per-day capacity—engineered to your needs.

Booklet on request, pictures installations

UNIVERSAL ROAD MACHINERY CO.
Main office and factory: Kingston, N. Y.
New York City office: 117 Liberty St.

The Reynolds Metals Company's LaQuinta alumina plant operated in Corpus Christi, Tex., has been named the Sherwin plant in memory of the late R. S. Sherwin Sr., a former Reynolds' vice-president.

Mr. Sherwin, who died on July 2, 1957, at the age of 80, had been with Reynolds since that organization went into the production of aluminum in 1940 and played a part in developing the American Bayer process for making alumina from bauxite.

---

J. I. Case Company of Racine, Wis., has announced a new policy, which doubles the customary service warranty on its exclusive counter-rotating Terramatic transmission from 6 months to one year. The one-year warranty is effective on all tractors delivered after July 15, 1957.

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Directors of the Atlas Powder Company have effected several changes in the board and officers of the company.

PRESTON W. PARVIS, secretary and treasurer of the firm, was elected a director. He succeeds WILLIAM J. WILEY, who has resigned as a director and financial vice-president.

D. J. COPPS and EDWARD J. GOETT, vice-presidents, were designated senior vice-presidents.

ROBERT J. REILLY, director of the company's economic evaluation department, was also elected an assistant secretary.

JOHN H. LEARY, assistant to the financial vice-president, has been appointed assistant to the president, Ralph K. Gotshall.

---

WILLIAM J. FAYMONVILLE and M. NEAL BURLESON have been named project directors for Reynolds Metals Company, Louisville, Ky.

Mr. Faymonville returns to Reynolds after a four-year absence during which he served with the Lynch Corporation as Canadian divisional manager in Toronto and export manager in Anderson, Ind.

Mr. Burleson comes to Reynolds from the Continental Can Company, where he served as packaging engineer.

---

JOHN R. MCCONNELL, former vice-president and director of advertising of American Air Filter Company, died recently following a short illness. He was 69.

Mr. McConnell retired last year after thirty-three years in the air filter business.

# Tru-Stop Brakes

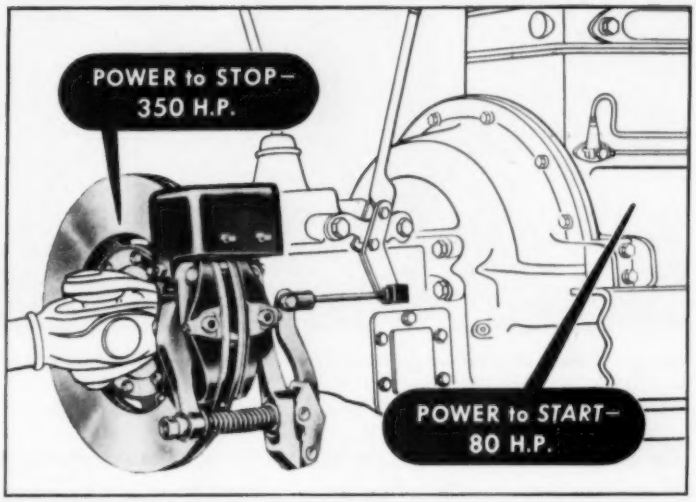
## Meet Every Heavy-Duty Safety Requirement

**OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST**

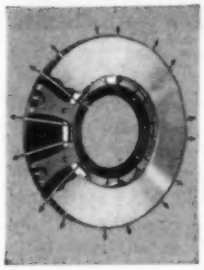
## HERE IS WHY:

### They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

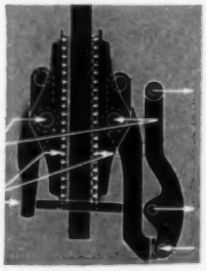



*Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits*



### Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.



### Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

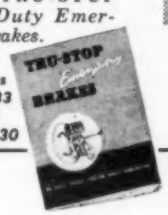
**FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE**

**TRU-STOP Brakes are used on a great variety of mobile and stationary equipment**

***SUCH AS—***

- Motor cranes
- Road rollers
- Dump trucks
- Power dividers
- Cooling tower fans
- Oil well pumps
- Cold header presses
- Scrubbing machines
- Wire rope stranders
- Fork lift trucks
- Motor scrapers
- Tractors
- Graders
- Diamond core drills
- Electric locomotives
- Oil well servicing rigs
- Railway inspection cars
- Shapers
- Power take-offs
- Winches
- Motor shovels
- Tractor loaders
- Conveyors
- Hard rock drill positioners
- Mine locomotives
- Power presses
- Railway power ballisters
- Cable tool spudders
- Aerial tram cars
- Tension wire stringers

*We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for Catalogs DH-33 and DH-530*




**Automotive and Aircraft Division**
**AMERICAN CHAIN & CABLE**

601 Stephenson Building, Detroit 2
2216 S. Garfield Street, Los Angeles 22 • Bridgeport 2, Conn.

ACCO
TRADE MARK

*One of the many drill rigs now in operation throughout the United States and overseas.*

The most important primary phase of construction, roadbuilding or mining begins with foundation investigation or exploratory work from which it is desired to get complete information and best possible cores. In many instances, contractors make the mistake of bidding on work or taking a contract without complete knowledge of sub-surface conditions, or miners will start mining operations without first conducting a thorough exploration program, but successful contractors and mining men always investigate first to know how to quote in order to get the contract and still make a profit, and how to plan to have a successful operation. One of the most reliable organizations in America for furnishing this information and satisfactory cores is Sprague & Henwood, Inc. For more than seventy years it has been rendering satisfactory core drilling service throughout the United States and the world. Many of its customers have continuing contracts with Sprague & Henwood, Inc., because they know that they can be assured of the best in foundation investigation and core drilling service that can be found anywhere.

Sprague & Henwood, Inc., with its own manufactured field tested drilling equipment; its own manufactured "Oriented" diamond bits; its highly trained personnel; and its well trained and highly qualified supervision assure you of the best possible results obtainable.

Write to Sprague & Henwood, Inc., today for any information relative to test borings or core borings you desire, or for an estimate, giving complete information, and it will be on its way to you just as quickly as possible, without obligation to you.

**SPRAGUE & HENWOOD, Inc.**
**SCRANTON 2, PA.**

BRANCH OFFICES: NEW YORK • PHILADELPHIA • PITTSBURGH • ATLANTA
BUCHANS, NEWFOUNDLAND • GRAND JUNCTION, COLORADO

## Death Claims B. A. Ford, Veteran on Sales Staff Of St. Regis Paper Co.

Burton A. Ford, who had been associated with St. Regis Paper Company since 1928, died on August 8, at his home in Allentown, Pa. Mr. Ford, who was 63 years old, was a member of the general staff of the

Burton A. Ford

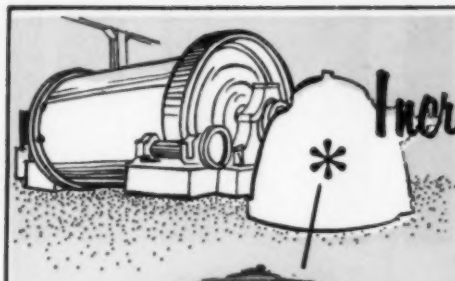
Multiwall Packaging Division, and had served in various sales management capacities with the company.

A leading figure in the nonmetallic minerals field, Mr. Ford had served as general manager of the National Lime Association from 1922-26 and later was made an honorary life-time member of the association. He served as sales manager of Bates Valve Bag Corporation, which was acquired by St. Regis, and continued in sales management posts with the company in the Southeastern and Mid-Atlantic sales districts of the Multiwall Packaging Division. He was named a member of the division's general staff in 1953.

## Barite Shipments Reported From New S. C. Operation

A new barite mining operation has begun in Cheroke county, S. C., according to W. H. Rodenbeck and his associates, who hold mining rights of about 500 acres with options on 500 to 600 more acres.

The first shipment of barite ore was sent to New Orleans for processing early in August. Initial mining capacity will be approximately 100 tons of barite daily.



# Increased CEMENT PRODUCTION

## BRADLEY HERCULES MILLS

* *as a preliminary pulverizer for compartment or tube mills.*

**The quickest, most economical way to increase your grinding capacity**

For the cement manufacturer with excess kiln capacity . . . here is the answer to INCREASED CAPACITIES at an appreciable SAVING IN HORSEPOWER. The Bradley Hercules Mill, used as a preliminary pulverizer, before compartment mills or tube mills, results in INCREASED PRODUCTION of finished material at a LOWER COST per barrel.

Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum.

Automatic electrical feed control eliminates manual operation.

*For complete information, write for Catalog No. 57*

**Bradley PULVERIZER CO.**

LONDON **ALLENTOWN, PENNA.** BOSTON

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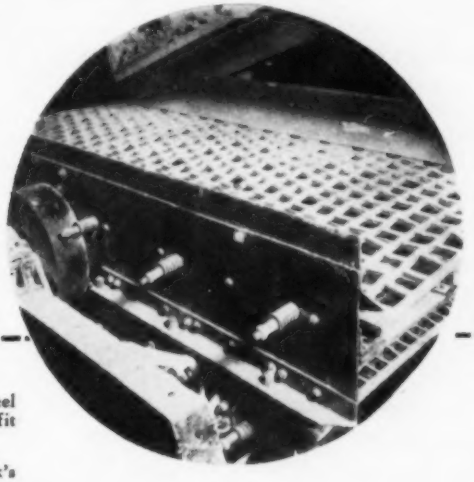
# HENDRICK PERFORATED PLATE PAYS OFF!



Here's how Hendrick H Quality Perforated Steel Plate can often mean the difference between profit and loss for your screening operations:

* Hendrick H Quality Steel comes from Hendrick's wide experience in selecting and specifying the best analysis of steel for the aggregates industry

* Hendrick H Quality Perforated Plate is available in high carbon steel, heat-treated after perforating for longer life

* Product uniformity is assured by uniformity of mesh throughout life of the screen

* Full clearance of Hendrick H Quality Plate practically eliminates blinding

* Faster deck changes . . . lower labor cost

* Large open area assures maximum protection

**Hendrick MANUFACTURING COMPANY**

39 DUNDAFF STREET • CARBONDALE, PA.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

# HIGH IN

P&H

# ELECTRICS

## ARE WORKING FOR SOUTHERN PERU COPPER

In their operations as high as 13000 feet in the Peruvian Andes at Toquepala, Peru, Southern Peru Copper is using P&H Electric Shovels. Their maximum availability and minimum maintenance are vital to high production. In addition to 10 P&H Model 1800 machines, Southern Peru Copper has purchased 23 P&H diesel powered excavators.

*Only P&H Electric Shovels have these outstanding exclusive features.*

**MAGNETORQUE®**. . . the electro-magnetic type coupling that transmits power from the hoist motor to the dipper for faster action, eliminating shock and impact to the hoist gear train and motor. Response is immediate to varying load conditions.

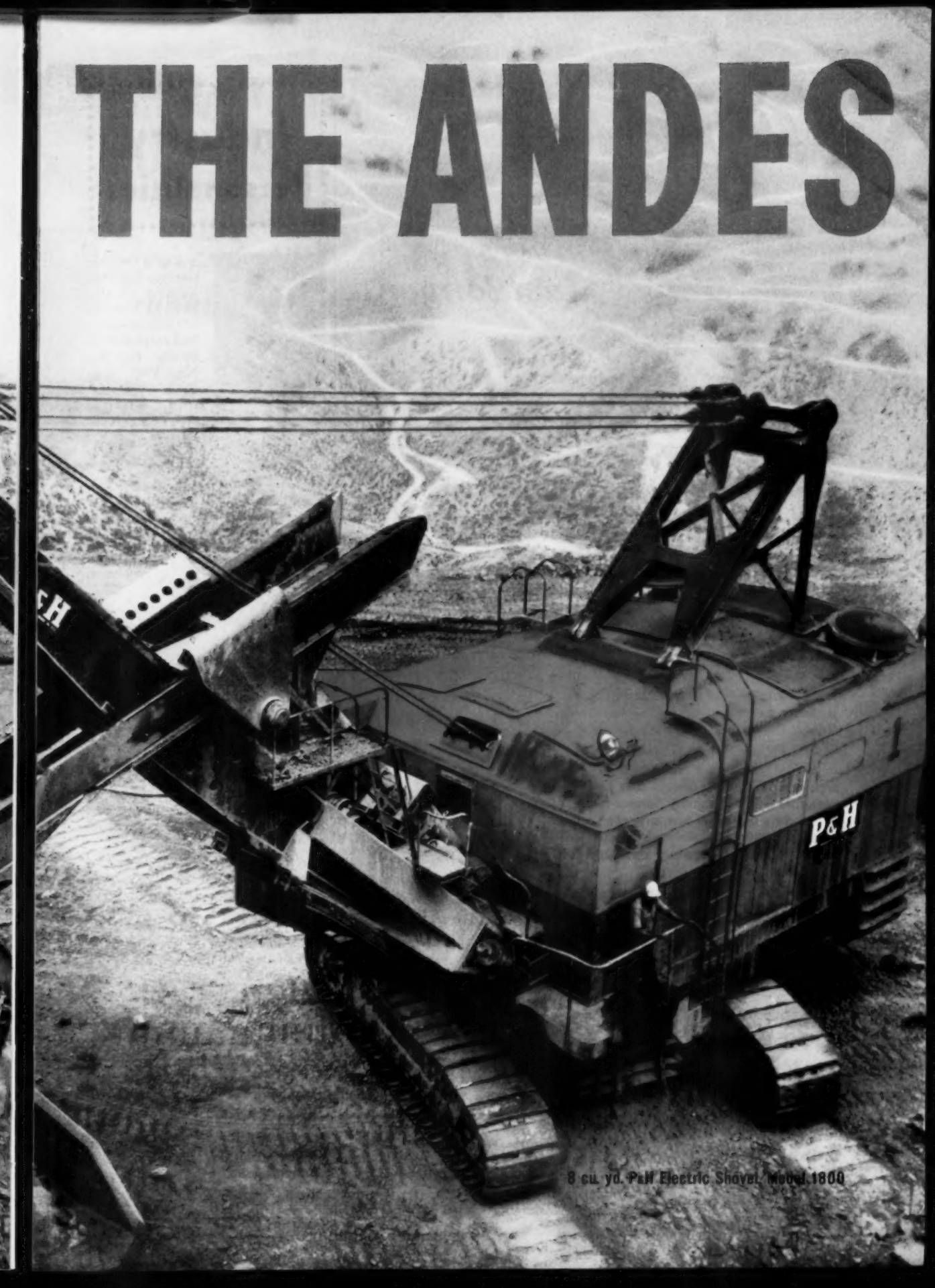
**ELECTRONIC CONTROLS** . . . providing the fastest action of any type of control available on electric shovels. All motions are smoother, resulting in consistently higher output.

Whether it's big P&H Electric Shovels from 3½ through 8 cu. yds., or smaller P&H excavators, it will pay you to choose from the P&H complete line. P&H offers single source responsibility for all your open pit mining needs.

**HARNISCHFEGER**

CONSTRUCTION & MINING DIVISION
Milwaukee 46, Wisconsin

# THE ANDES




8 cu. yd. P&H Electric Shovel, Model 1800

*Drivers last longer...*

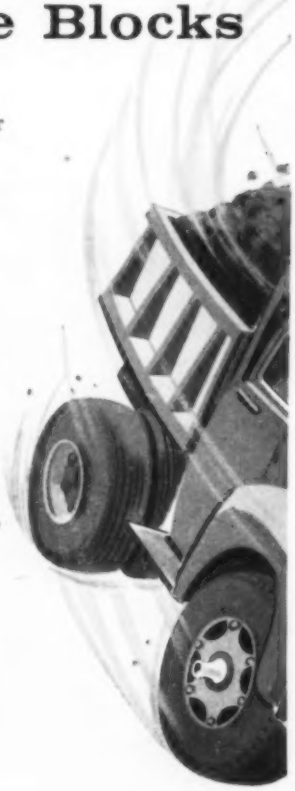
**when heavy-duty trucks use J-M Brake Blocks**

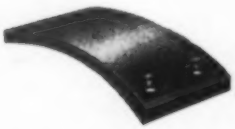
• Johns-Manville Brake Blocks deliver the safe, dependable performance that frees your drivers from worry about personal danger. And remember, it's much easier to replace linings than good operators. You get more out of your equipment too, in terms of working time and "pay loads" handled.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for outstanding performance plus maximum service life on trucks, shovels and heavy machinery.

Johns-Manville makes a wide range of industrial friction materials such as linings, facings, cones and segments that are "original parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are available in Johns-Manville Assembled Sets that assure greatest safety in your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario. Ask for booklet FM-35A





Johns-Manville
INDUSTRIAL FRICTION MATERIALS

# Industry Personalities

A. M. Griffin

ARTHUR M. GRIFFIN has been named to the post of director of community and employee relations for the New York Trap Rock Corporation, effective August 1. In his new position he will plan, administer, and co-ordinate the company's community and employee relations program.

Mr. Griffin was formerly aviation promotion supervisor for the Port of New York Authority, and before that senior educationist on the staff of the administrator of the Civil Aeronautics Administration in Washington, D. C. He was also (1946-1948) a pilot for Eastern Air Lines, and served as a captain in the U. S. Army Air Corps.

At an annual meeting of stockholders of the Material Service Corporation, Chicago, Ill., HUGO A. ANDERSON was elected a member of the board, and Henry Crown, Stuart Colnon, Sidney J. Marks, Irving Crown, George W. Lenzie, Edward A. Crown, Frank Nugent, Joseph P. Binns, George B. Harrington, and Robert Crown were re-elected directors.

W. R. SMALLWOOD, in charge of sales for the Jordanville, N. Y., plant of the General Crushed Stone Company, Easton, Pa., has been transferred to the Watertown, N. Y., plant as assistant district sales manager of the Watertown office.

EDWARD D. BARTON succeeds Mr. Smallwood at the Jordanville plant. Mr. Barton was formerly sales representative at Watertown.

The Material Service Corporation has promoted GEORGE ROSINSKI to sales manager of the industrial division of the Marblehead Lime Company, a subsidiary. D. W. BRANAN was promoted to the position of sales manager of the construction division, and LLOYD ROBINSON was named assistant sales manager of the subsidiary.

# A CAT* Diesel has powered this shovel for 24 years

The Caterpillar Engine in this Lima shovel was installed at the factory in November, 1933. It's still producing—in a big way—for Calcite Quarry Corp., Lebanon, Pa.

Calcite purchased this shovel in 1942 and since then the engine has provided power to load 3 million tons of high-calcium rock. During a two-year stretch it operated 16 hours a day around the calendar.

"We can depend on this engine," reports president George Patten, "to give us a full day's work every day."

This kind of performance is one reason why dependable Caterpillar Engines are first choice at quarries everywhere. Caterpillar engineers have designed these engines to pack more power and deliver greater efficiency, greater economy and longer life. Their four-cycle design gives you a longer power stroke, resulting in smoother, more efficient operation than in two-cycle engines. There are no cylinder ports to clean. And the exclusive fuel injection system permits you to use low-cost No. 2 furnace oil without fouling.

Caterpillar Engines have always been honestly rated. Now each engine comes to you with a signed and notarized certificate of the horsepower it will deliver.

Whatever your original or replacement needs, see your nearby Caterpillar Dealer. He has a full range of engines with *certified power* up to 650 HP (maximum output capacity). And he backs each engine with fast, efficient service and quality parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

**CATERPILLAR***

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# Portable VEHICLE SCALES

## weigh anything ...anywhere!

**Here's the perfect portable vehicle scale . . . rugged, self-contained, easy to install and move, no pit required . . . *accurate!***

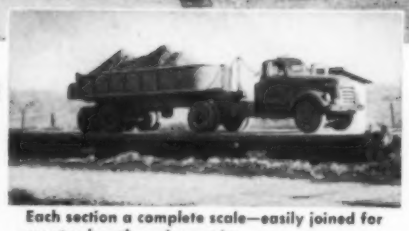
**Capacities from 20 to 70 tons—lengths from 20 to 60 feet. Individual sections can be joined with *just 8 bolts* for greater length and capacity.**

**And you can select any weight indication—full capacity beam, type recording beam for printed records, or attachable Weightograph® for direct enlarged visual readings.**

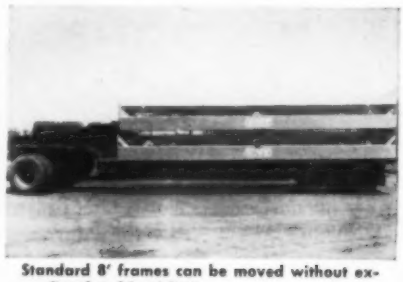
**All this *plus* the extra ingredient—a solid century of scale skill built into every Howe Scale. Don't settle for less.**

**PORTABLE VEHICLE SCALE FOLDER ▶**

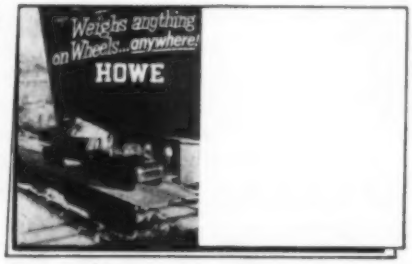
***Write today for this folder giving complete details and specifications on Howe Portable Vehicle Scales.***



**Each section a complete scale—easily joined for greater length and capacity.**



**Standard 8′ frames can be moved without exceeding legal load limits.**




CENTENNIAL 100 YEARS HOWE 1857 1957

The HOWE SCALE Co
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.
RUTLAND • VERMONT


HARRY T. HAWKINS has been elected president of the Buffalo Gravel Corp., Buffalo, N. Y., succeeding the late Carlton J. Lewis. Mr. Hawkins joined the corporation 20 years ago as sales manager and has been vice-president for about three years.

The Portland Cement Association has opened a branch office in Detroit, Mich., to supplement district headquarters in Lansing, Mich., and has announced the following assignments of personnel:

R. A. BAGKUS, housing and products engineer, becomes paving and public works engineer for the Detroit suburban area, while J. E. KRATZER, general field engineer in southeastern Michigan, moves to Detroit as paving and public works engineer for Wayne County.

T. M. REYNOLDS, paving and public works engineer in the Detroit area since 1949, now is at Lansing, assigned to statewide duties.

ELBRIDGE G. MCCONNELL JR. has been appointed assistant sales manager of the Dayton, Ohio, sales territory of the Universal Atlas Cement Company, New York, N. Y.

Mr. McConnell joined the cement company's Pittsburg, Pa., office as a salesman in 1926. He was transferred to the Dayton sales district in 1946. Until his promotion, he was sales representative in the Hamilton County area.

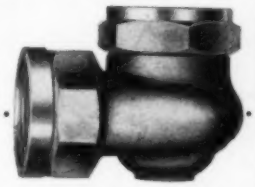
LLOYD L. SCHWARZ was named assistant sales manager of the St. Louis, Mo., sales territory of Universal Atlas.

Mr. Schwarz joined the firm's Chicago office in 1948. He was made salesman in 1949, and until his appointment to the St. Louis district, he served in a sales capacity for the company in the Illinois, Wisconsin, and Metropolitan Chicago sales territories.

JAMES C. SPENCE has been appointed New York City area representative for the Zonolite Company. A civil engineering graduate of Illinois Institute of Technology, Mr. Spence served as an engineer with the Vermiculite Institute for the last four years.

W. E. WALTERS has been named manager of the Pittsburgh Chemical Department of the General Portland Cement Company, succeeding L. K. Jones, who will assume the duties of manager of the Pittsburgh Special Test Department. Mr. Walters has been at the company's Pittsburgh testing laboratory since 1953.

SPRAYING SYSTEMS CO.



for lower cost

and better performance

**SPRAY NOZZLES**

Modern design. Precision machining. All materials. Thousands of standard industrial spray nozzle types and sizes to choose from. Years of proved experience at your service.

***write for this great new catalog today***

Ask for our new 48 page Catalog No. 24 . . . the most comprehensive spray nozzle catalog ever produced. Yours for the asking.

**SPRAYING SYSTEMS CO.**
3224 Randolph Street • Bellwood, Illinois

**PLATEGRIP**
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

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5394 Northwest Highway, CHICAGO 30, U. S. A.

**Auto-Vortex Classifiers are delivering sharp gradations and recovering fines . . . at lower operating costs . . . in hundreds of installations all over the country.**

**CHARLES E. WOOD CO.**
AUTO VORTEX CLASSIFIERS
906 N. WATER ST. • MILWAUKEE 2, WIS.

WE'D LIKE TO SOLVE YOUR CLASSIFICATION PROBLEMS. WRITE TODAY!

*Consult*

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232 N. MAIN ST.
SALISBURY, N.C.

**. . . save 50% with our BIG TIRE Recapping Service**

HARD ROCK LUG SIZES 1100x24 THROUGH 33.5x33

**GOES AS FAR AS A NEW TIRE**

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**COSTS ONLY HALF AS MUCH**

A call on CAROLINA will cut your big tire costs per mile and per ton!

We go anywhere, anytime, to pick up worn casings, and return them reconditioned to give you the *same* use as a new tire . . . at 50% off! On-the-job service is also available.

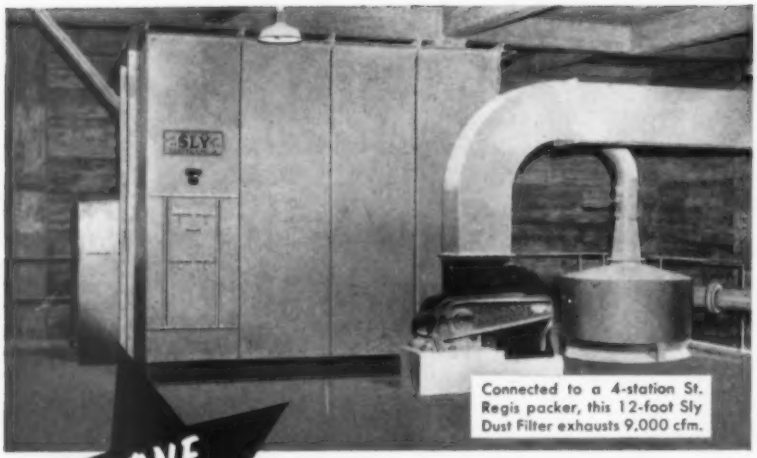
Scores of testimonial letters from contractors and quarry and strip mine operators attest the profit-boosting quality of CAROLINA Service.

We have more than 2000 service operators "on duty" in 30 states and some foreign countries.

We have earthmover tire bargains galore.

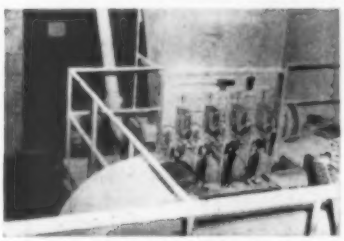
***Write for information***

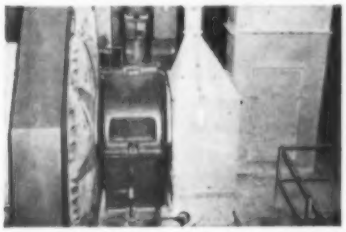
**CAROLINA TIRE COMPANY**
**232 N. MAIN ST. • SALISBURY, N.C. • PHONE 5200**



Connected to a 4-station St. Regis packer, this 12-foot Sly Dust Filter exhausts 9,000 cfm.

LONE STAR saves with SLY DUST CONTROL


Dust hood at 4-station St. Regis packer.


Dust hood at one of the ball mills.

Dust hood leading from 24" screw conveyor.

Cleanliness pays off in this Lone Star Cement Corporation plant where Sly Dust Filters give an *all star* performance, 24 hours a day, day after day.

These filters collect dust at critical points — save cement — effect operating economies — assure a cleaner plant. For Sly Dust Filters are designed and built with an abundance of cloth for greater filtering capacity and a 100% filtering job.

Top notch performance with *"no appreciable maintenance"*— such is the record of Sly in this plant as in thousands of others. Long experience, as pioneers in the field, provides a background for the advanced engineering Sly users receive.

If you have a dust problem, let's talk it over. Ask for Bulletin 98 — full of helpful information on controlling dust, *economically.*

*Designers and Manufacturers of: Dust Control Systems, Blast Cleaning Equipment, Tumbling Mills, Industrial Ovens.*

SINCE 1874

THE W. W. SLY MANUFACTURING CO.

4745 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES


# Obituaries

MAX AGRESS, 77, a geologist who discovered one of the first commercial potash deposits in west Texas, died recently at his home in Dallas.

After discovering the potash deposit in the Permian Basin in 1918, Mr. Agress founded the Standard Potash Company and served as its first president.

W. H. PULLEY, 57, Southeastern Division manager of the National Gypsum Company died at his farm near Roswell, Ga. Mr. Pulley was with National Gypsum for 25 years. He had served as Southeastern Division manager for three years. Previously, he had been the Atlanta division manager.

EARL DONALD BARNETT, 68, superintendent of the Colwell Lime and Cement Company's plant in Concord, Calif., from 1921 to 1946, died recently in an Oakland hospital.

HARRY R. BRENEMAN, 73, vice-president of E. J. Breneman, Inc., Sinking Springs, Pa., died in Pottstown Hospital, Pottstown, Pa.

Mr. Breneman served as superintendent of the J. T. Dyer Quarry Company, Pottstown, before joining Breneman, Inc., a firm operated by his son.

ERWIN J. FARR, divisional sales manager of the Huron Portland Cement Company's Michigan and New York offices, died recently of a heart attack at the age of 62 years. He had been with Huron since 1944.

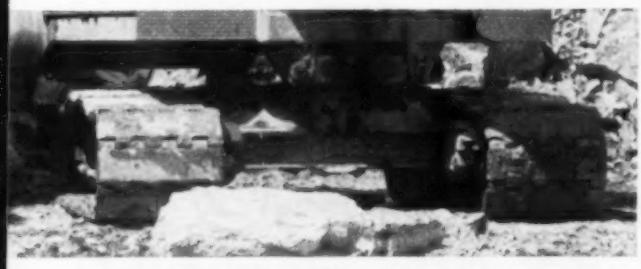
WILLIAM A. MCINTYRE, 77, retired executive of U. S. Steel's Universal Atlas Cement Company, died recently in Paoli, Pa. He retired from his position of Philadelphia sales manager in 1946 after 16 years of service.

ANDREW K. HUMPHRIES, 62, chairman of the board of Pacific Cement and Aggregates, Inc., San Francisco, Calif., died of a heart attack at Oakland.

EDWARD J. MURRAY, 69, president of the Plaza Sand and Stone Corporation of Yonkers, N. Y., died recently in a local hospital.

# HOW AMERICAN CUT SHOE REPLACEMENT

Quarry operations really test a crane's crawler design. Yet, owners of American 300 Series Shovels and Cranes report years of tough operation without a single crawler shoe replacement! Here's why: American shoes, cast from special alloy steel, have heavy duty, double walled design. Four interlocking lugs distribute pin wearing forces over the whole track pin virtually eliminating the possibility of bending or breaking the pin.



**EIGHT INTERLOCKING SHOE LUGS** plus floating track pins reduce track wear and expense. The floating pins wear evenly, longer, because they're free to turn.

All rock for the 600 ton per day limestone production of the O'Fallon Quarry and Supply Company, located west of St. Louis, Mo., is easily supplied by one American 300 Series Shovel, shown above. The American actually prescreens the rock because any pieces too large for the bucket are too big for the crusher.

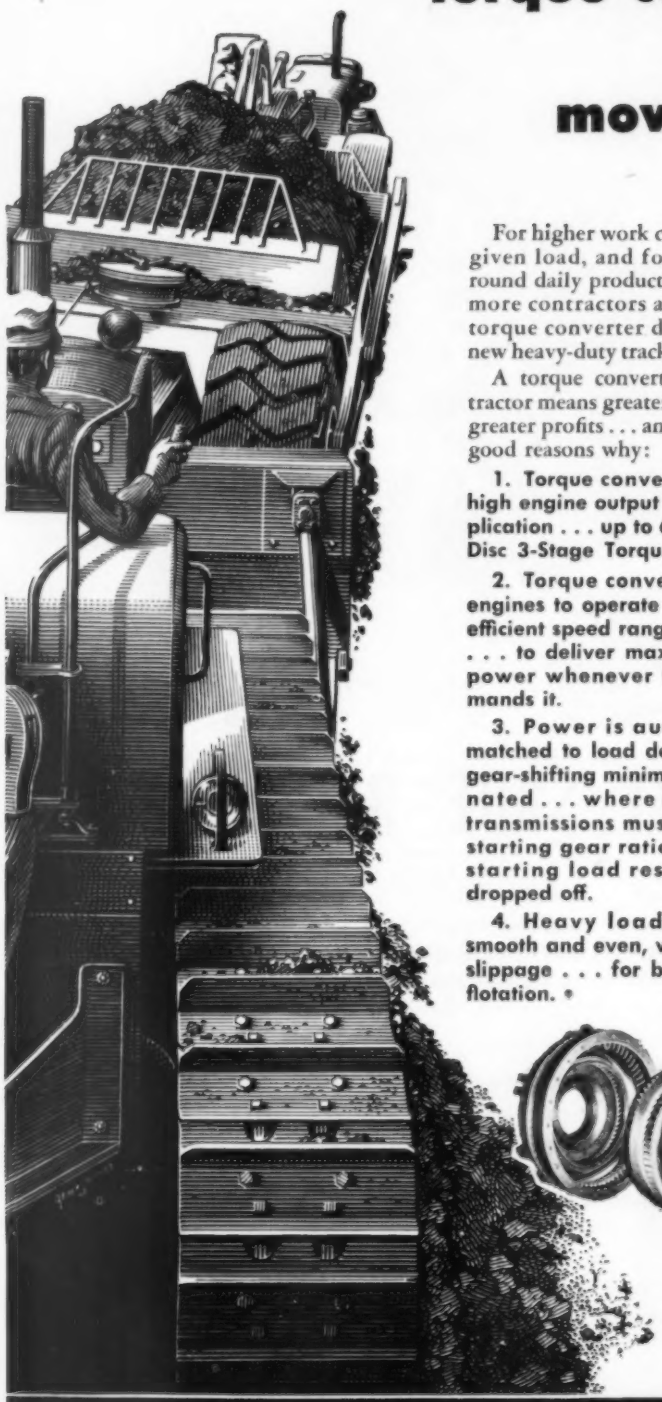
American 300 Series Shovels prove their outstanding durability in quarries across the country. Ask American owners about the performance of their machines—then check with your distributor for complete data on the American line in sizes from ½-yard up.

## AMERICAN HOIST

and Derrick Company

**St. Paul 7, Minnesota**

# Here's why torque converter equipped tractors move more dirt...



For higher work capacity on any given load, and for greater all-round daily production, more and more contractors are specifying torque converter drives in their new heavy-duty track-type tractors.

A torque converter drive in a tractor means greater work output, greater profits . . . and here are five good reasons why:

**1. Torque converters provide high engine output torque multiplication . . . up to 6:1 with Twin Disc 3-Stage Torque Converters.**

**2. Torque converters permit engines to operate in their most efficient speed range at all times . . . to deliver maximum horsepower whenever the load demands it.**

**3. Power is automatically matched to load demands, with gear-shifting minimized or eliminated . . . where mechanical transmissions must stay in the starting gear ratio, even after starting load resistance has dropped off.**

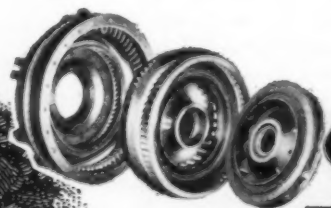
**4. Heavy load pick-up is smooth and even, without clutch slippage . . . for better over-all flotation.**

**5. An infinite variety of ratios is available to work with, permitting smooth, accurate control and delicate handling of loads when required.**

Besides boosting production on the job, torque converter equipped machines offer another important advantage, too. The fluid connection between the engine and the machine's drive train cushions out destructive shocks and vibrations . . . meaning less wear and parts replacement . . . less downtime on major equipment investments.

Allis-Chalmers, Caterpillar and International Harvester all offer certain track-type tractor models equipped with torque converter drives, either as standard or as optional equipment. But, regardless of the model or whether the drive is standard or optional, the torque converter components will be furnished by Twin Disc Clutch Company. All three of the "big three" *standardize on Twin Disc for torque converter components.*

Be sure to specify a torque converter drive in your next track-type tractor . . . and watch your profits go up from then on in.



TWIN DISC

**TWIN DISC**
*Torque Converters*

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • TULSA

# A *single strand* of the mighty No. 860 chain can handle 30" buckets!

# Now you can use one strand in place of two

**Biggest.** With an 18" span between outside holes in the K-4 attachment link, a *single strand* of Kensington's new No. 860 elevator chain easily handles buckets up to 30" wide.

**Strongest.** The No. 860 chain is heavied-up at all critical points. At its weakest point, for example, it has a cross section of 3.75 square inches at 76,000 lbs. psi for an ultimate strength of 285,000 lbs. Using the customary 6:1 safety factor, this means the No. 860 has a safe working load of 47,500 lbs. . . . *almost 50% more than the next strongest elevator chain on the market!*

Consider too, the 1½" pins . . . live bearing area, barrel contact area, ¾" bucket bolts. On whatever basis you compare, the No. 860 far excells in ruggedness.

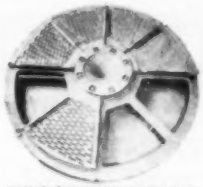
**Built of KENKROME.** The No. 860 chain is built from KENKROME . . . an unusual alloyed manganese steel specially created by Kensington to resist wear and abrasion.

Exceptionally hard to begin with, KENKROME has the ability to develop even greater *surface hardness* when exposed to use. Yet beneath this ever-hardening "skin", the metal stays tough and able to withstand the shocks and impact that break steels which are hard all-the-way-through.

**Kensington renewable tooth sprockets** are also big money savers. KENKROME Tooth Segments can be replaced by 2 men during lunch hour . . . without even removing the chain! And a new set of teeth cost only a fraction of what you'd pay for a complete one-piece sprocket.

When you order your next elevator chain, it will pay you to specify Kensington's No. 860 Chain and Renewable Tooth Sprockets.

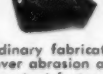
**Other wear-resisting KENSINGTON replacement parts:**



**DIVISION HEAD SECTION**
for grinding mill has exclusive design features which greatly prolong service life.

**SCREENS, GRATES, LINERS**
and other alloyed manganese steel replacement parts fit all standard cement mills.

**CHAINS, SPROCKETS**
150 different standard chains and sprockets plus many special models . . . all of wear-defying KENKROME.



**KENKROME ELEVATOR BUCKETS**
far outlast ordinary fabricated buckets wherever abrasion and impact are important factors.

**Kensington STEEL**

**KENSINGTON STEEL,** Dept. P, 505 Kensington Ave., Chicago 28, Ill.
DIVISION OF POOR & COMPANY, CHICAGO

☐ Please send me more information on the No. 860 chain
☐ Please send information on the following special wear-resisting replacement parts:

NAME_____

COMPANY_____

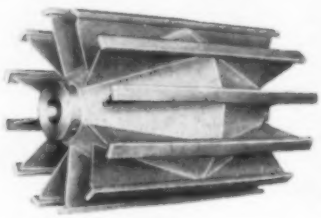
ADDRESS_____

CITY_____ ZONE____ STATE_____

SAVE MONEY
IN MATERIAL HANDLING
with STANDARD
EQUIPMENT

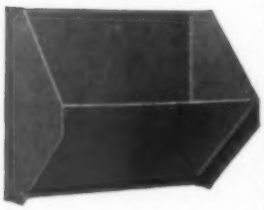
**STANDARD WING-TYPE SELF-CLEANING PULLEY**

- LOW COST
- LONGER LIFE
- GREATER STRENGTH WITH LESS WEIGHT



Reinforced all-steel welded construction of this Standard Pulley provides longer service, lower operating costs, greater efficiency. Built to deliver maximum service under severe operating conditions, the self-cleaning design combines far greater strength with less weight.

**CONTINUOUS ELEVATOR BUCKET STYLE #2**



This style of bucket is just one of several types of steel elevator buckets manufactured by Standard. All Standard Buckets are built to provide exceptional resistance to wear . . . to give longer service and lower costs. Available in Salem, Style "A," shelf type and other continuous style buckets for all types of operations.

**STANDARD BIN GATE**

Easy-to-operate, fast and efficient, this Standard gear-operated Bin Gate results in greater output in less time with lower labor costs. All-steel welded construction for longer life. Other styles of Standard Bin Gates also available.

SM2

To lower costs, specify Standard equipment for new installations or replacements. Write today for catalog showing the complete line of Standard products.

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Teeth that really dig!

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H&L TOOTH COMPANY
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*Quick starts down to*
**65° BELOW ZERO**
*for Diesel and gasoline engines*

SPRAY STARTING FLUID, with the propellent used in the pressurized can, insures quick starts for Diesel and gasoline engines in temperatures as low as 65° F. below zero and withstands 180° F. heat. This combustible propellent was developed after two years of research. SPRAY STARTING FLUID pressurized with our inert propellent is absolutely safe and odorless in storage.

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**CONTRACT CORE DRILLING**

**EXPLORATION FOR MINERAL DEPOSITS**
INCLUDING URANIUM & LIMESTONE — ANYWHERE
**FOUNDATION TEST BORING**
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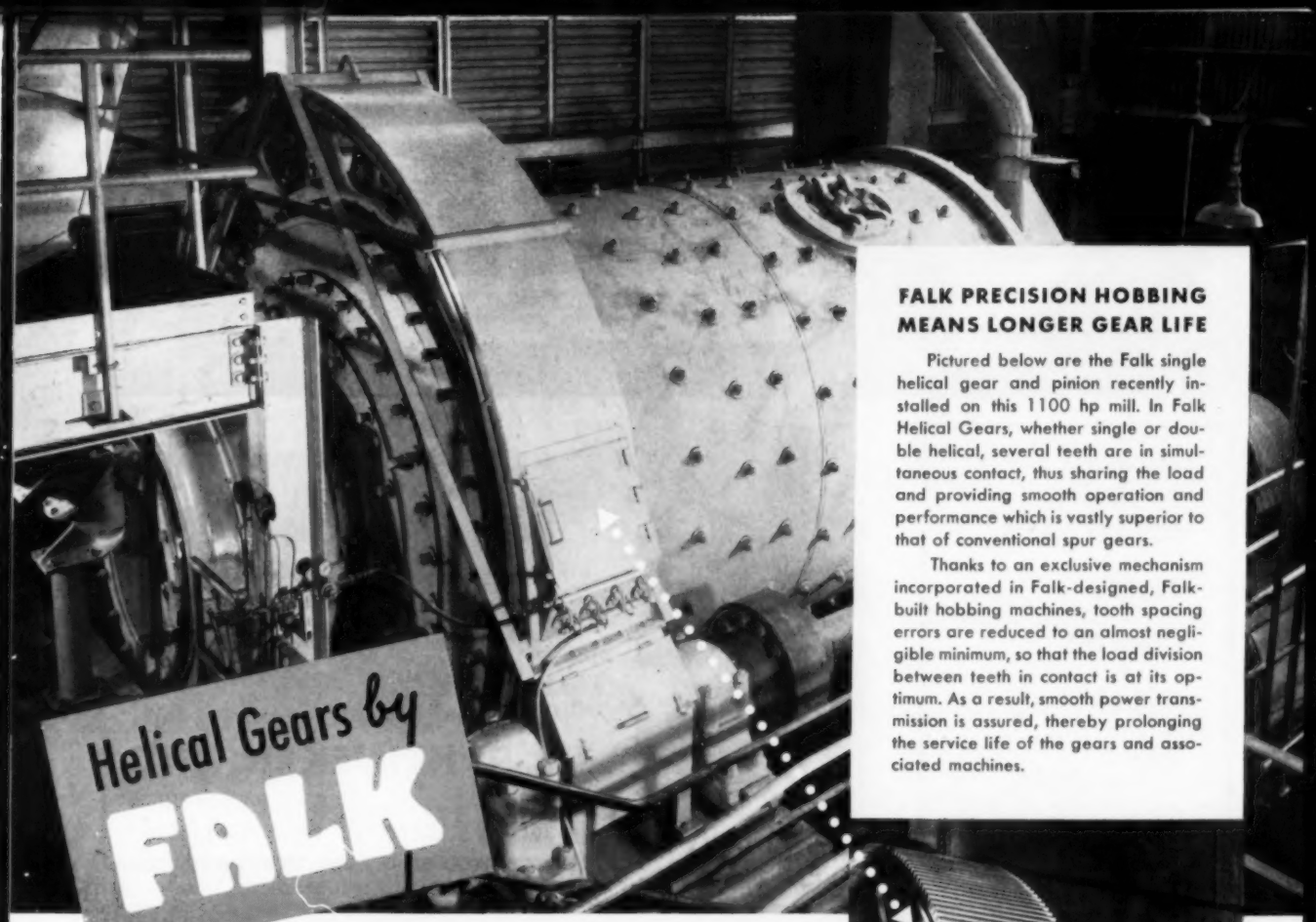
Skilled crews and complete stock of core drills and accessory equipment maintained at all times

*Core Drill Contractors for more than 60 years*

JOY MANUFACTURING CO.
*Contract Core Drill Division*
MICHIGAN CITY, INDIANA



Helical Gears by FALK

## FALK PRECISION HOBBING MEANS LONGER GEAR LIFE

Pictured below are the Falk single helical gear and pinion recently installed on this 1100 hp mill. In Falk Helical Gears, whether single or double helical, several teeth are in simultaneous contact, thus sharing the load and providing smooth operation and performance which is vastly superior to that of conventional spur gears.

Thanks to an exclusive mechanism incorporated in Falk-designed, Falk-built hobbing machines, tooth spacing errors are reduced to an almost negligible minimum, so that the load division between teeth in contact is at its optimum. As a result, smooth power transmission is assured, thereby prolonging the service life of the gears and associated machines.

# ...your Best Buy in gears!

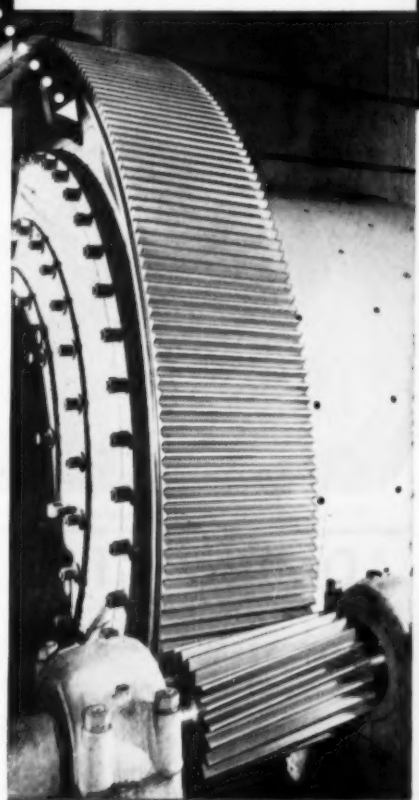
In these times of industrial expansion and modernization, Falk Helical Gearing is more than ever the first choice of experienced, economy-minded users of gear-driven equipment.

This increasing preference is the result of proved performance. Falk Helical Gears and Pinions provide *better performance over a longer service life* because they are correctly engineered...their accurately generated teeth have extra depth and extra capacity...gear efficiency, as shown by actual test data, is 98+%...the highest you can buy!

Other superior features include: high reduction ratios which permit use of higher motor speeds for greater efficiency and reduced power costs; maximum resistance against abrasive wear; smooth, helical gear action. All these factors contribute to the long service life of trouble-free operation for which Falk gears are famed the world over.

When expanding or remodeling your production facilities, it pays to remember that the performance of your equipment will not be any better than the performance of the gears that drive it. So, if uninterrupted production is important to you, specify Falk Helical Gears. They're available in sizes up to 18 ft. in diameter...in capacities up to 2000 hp.

Consult any Falk representative—also, write for **Engineering Report 6170,** "Advantages of Helical Gearing."



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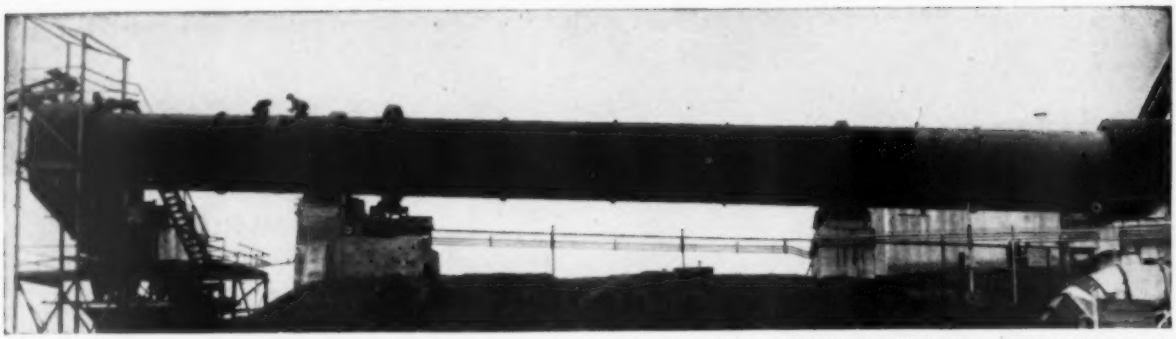
...a good name in industry

**THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.**

Representatives in Most Principal Cities



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We design and manufacture

ROTARY KILNS
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DRYERS
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COOLERS
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LIME HYDRATORS
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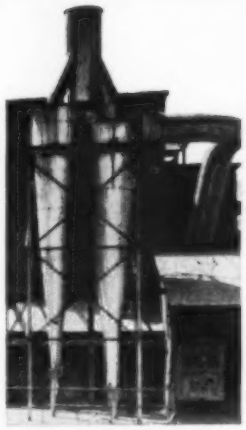
DUST COLLECTORS

and design the plants in connection with the same.



NEW HIGH EFFICIENCY DUST COLLECTOR

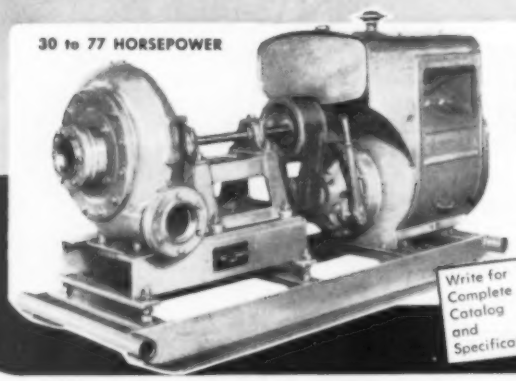
7'x60' CLAY DRYER INSTALLED IN HENDERSONVILLE, N. C.

**W. P. HEINEKEN, INC.**

ENGINEERS MANUFACTURERS

50 BROAD STREET • NEW YORK 4, N. Y.

30 to 77 HORSEPOWER



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NEW *Lightning* PORTABLE

**SAND & GRAVEL PUMPS**

*4 AND 6 INCH SIZES*

New design for a wide variety of uses and pumping conditions. 4-inch pump has 30 H.P. air-cooled engine; 6-inch pump has 6-cylinder radiator cooled engine. All wearing parts are of Hi-Chro-Hi, a super hard, abrasion resisting semi-steel. Maintenance is negligible, parts replacement is simple.

**KANSAS CITY HAY PRESS CO.**

*Manufacturers of Heavy-Duty Lightning Sand and Gravel Pumps*

801 WOODSWETHER ROAD • KANSAS CITY, MISSOURI

# ADMIRO...for L-O-N-G-E-R Truck Bed Service

HEAT TREATED ALLOY STEEL

Truck beds naturally take a beating, but they last a lot longer when protected the ADMIRO way. This is the modern, effective defense against severe abrasion and heavy impact. ADMIRO Heat Treated High Tensile Alloy Steel increases machine service life . . . lowers down-time . . . reduces upkeep to a minimum. Available in bars and plates.

**COMPLETE FABRICATING FACILITIES**

***Welding—Rolling—Forming***

***Intricate Shapes Cut to Specification***

Recommended Applications: Wear liner plates, crushers, hoppers, buckets, bins, chutes, dirt and rock recovery equipment. Special uses in Mining, Quarrying, Cement and Aggregate Plants.

***Write for Bulletin***

**ADMIRAL ALLOY STEEL CORP., 850 Euclid Ave., Cleveland 14, Ohio**

ADMIRAL ALLOY STEEL CORP. of Texas, 2802 Rector St., Dallas 15, Texas

# *It will pay you to* **LEAP** *into this profitable new business...*

## "LIGHTWEIGHT AGGREGATE"

**...but LOOK first**

**HERE'S WHAT YOU SHOULD KNOW!**

There are hundreds of different types of clays and shales—all with different bloating characteristics.

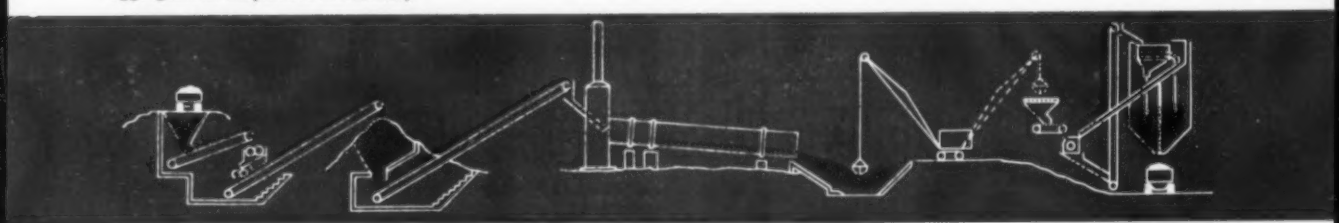
The selection of the process for preparing lightweight aggregate of the proper characteristics and size is determined by the raw material and must be made with care. McNally Pittsburg researchers, designers, and engineers have conducted a careful study of the best processing methods, and the design and construction of plants and equipment for the profitable manufacture and processing of lightweight aggregates in all parts of the country.

Last year there wasn't enough lightweight aggregate to "go around."

America's greatest Building Boom is just getting under way—and no end in sight for at least 10 years.

Builders and architects are fast turning to concrete and blocks made with lightweight aggregate!

That's why the wise operators are saying, "Let's get into a new business, 'LIGHTWEIGHT AGGREGATE.'"



*"Ask the men who know"*

**McNALLY PITTSBURG MANUFACTURING CORPORATION**

**DESIGNERS AND BUILDERS OF EQUIPMENT FOR BASIC INDUSTRY**

**COMPLETE PLANTS OR SINGLE MACHINES**

**Clay Disintegrators**
**Clinker Breakers**
**Conveyors • Coolers • Hoists**
**Jaw Crushers • Kilns**
**Roll Crushers • Vibrators**
**Apron and Reciprocating Feeders**
**Materials Handling Equipment**

**GET THIS FREE BROCHURE AND SPECIAL INFORMATION**

**McNally Pittsburg Mfg. Corp., Dept. P**
**Pittsburg, Kansas**

Gentlemen:

Please send brochure on Lightweight Aggregate plants. ☐

Desired capacity of plant per day is _____.

Shale ☐ Clay ☐

Name_____Title_____

Company_____

City and State_____

# Limestone...

for CEMENT

for CHEMICAL LIME

for ALKALIES

for REFRACTORIES

for GLASS

for SOIL CONDITIONING

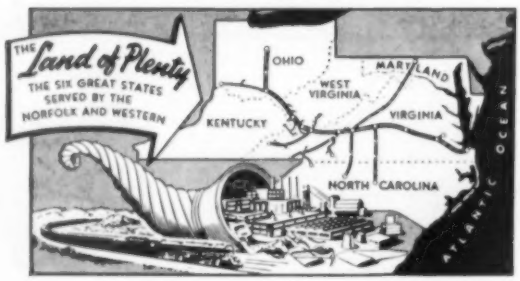
for WATER PURIFICATION

for ROCK WOOL

for CALCIUM CARBIDE

| | DNL-1-1 | DNL-1-2 | DNL-1-3 |
|---|---|---|---|
| SILICA ($SiO_2$) | .36% | .30% | .34% |
| IRON OXIDE ($Fe_2O_3$) | .072 | .043 | .049 |
| ALUMINA ($Al_2O_3$) | .21 | .20 | .19 |
| LIME (CaO) | 55.00 | 54.90 | 55.40 |
| MAGNESIA (MgO) | .65 | .62 | .51 |
| SULPHUR (S) | .012 | .011 | .015 |
| PHOSPHORUS (P) | .006 | .006 | .009 |
| IGNITION LOSS | 43.20 | 43.50 | 43.20 |
| CALCIUM CARBONATE (Calculated) | 97.90 | 97.72 | 98.51 |
| MAGNESIUM CARBONATE (Calculated) | 1.36 | 1.30 | 1.07 |

Analyses by
Pittsburgh Testing Laboratories
Pittsburgh, Pennsylvania




If you need new limestone sources — high-calcium or dolomitic — *The Land of Plenty* is the place for you. In one location alone, the supply exceeds 100 million tons, testing 97.8% calcium carbonate, and in mineable thicknesses of more than 100 feet.

There are other compelling advantages in this territory for the limestone industry — nearness to markets . . . dependable home-rooted workers . . . plenty of power and water . . . the world's finest Bituminous Coal . . . precision N&W rail service . . . clean, progressive communities, and many more.

Let the Norfolk and Western's plant location specialists give you detailed information about excellent plant sites near top-grade limestone deposits. Their service is yours for the asking — they will provide complete details, promptly, reliably, in confidence and without obligation.

*Write, wire or call—*

**L. E. Ward, Jr., Manager**
**Industrial and Agricultural Department**
**Drawer PQ-773 (Phone Diamond 4-1451, Ext. 474)**
**Norfolk and Western Railway**
**Roanoke, Virginia**

**Norfolk and Western RAILWAY**

"324 tons per hour with 35% crush . . .

Wet and dry gravel crushed to 1" base material . . .

Maintenance costs estimated at 3/4¢ per ton . . .

Very little down time . . ."

Cedarapids Built by IOWA

**No wonder Frank McLaughlin, President of F. J. McLaughlin Co., Marshall, Minn., is so well satisfied with his**

# CEDARAPIDS JUNIOR TANDEM

For some 14 years, Cedarapids Junior Tandems have always been hard plants to beat for high tonnage production. Newly re-designed last year, today's Junior Tandem adds a new kind of versatility to its profitable high capacity. With its bigger screen, and choice of jaw and roll crusher sizes which can be matched or mixed to give big primary capacity, big secondary capacity . . . or both . . . *the Junior Tandem is adaptable to the pit conditions you have to meet.*

Only a complete description of every Junior Tandem feature can show you how this plant will fit your profit picture. Ask your nearest Cedarapids distributor for details and production figures.

**IOWA MANUFACTURING COMPANY**
**Cedar Rapids, Iowa, U.S.A.**

**Apply these NEW JUNIOR TANDEM FEATURES to your job!**

**YOUR CHOICE OF CRUSHER SIZES**
10" x 36" jaw crusher gives extra primary capacity when crushing percentages are high. 10" x 24" jaw crusher meets average conditions. 30" x 18" roll crusher assures production of high percentages of fine-crushed product. 24" x 16" roll crusher meets normal secondary crushing requirements.

**BIGGER SCREEN**
Width of the Horizontal Vibrating Screen has been increased 6" and a half deck has been added. The 42" x 10', 2½-deck screen produces from one to three products simultaneously, from 2" road ballast down to minus ¼".

**"BIG PLANT" FEATURES AT SMALLER PLANT COST**
Junior Tandems now available with sand ejector screw and washing spray bars (optional); monotype elevating wheel; delivery conveyor backstop; belt wipers; self-cleaning pulleys; new type adjustable eccentric on reciprocating feeder; larger hopper; separate clutch control on screen.

# time will tell...

**made hard and tough to the core...for the long grind**

The STANDARD OF COMPARISON around the world in grinding balls is Moly-Cop. Time and again, in mills all over the world the long wear of Moly-Cop balls has been the answer to production economies. Next time you order grinding balls — think a minute — then specify Moly-Cop alloyed, forged and heat treated grinding balls by Sheffield.

**SHEFFIELD**

ARMCO®

**MOLY-COP**

COPPER-MOLYBDENUM-ALLOY

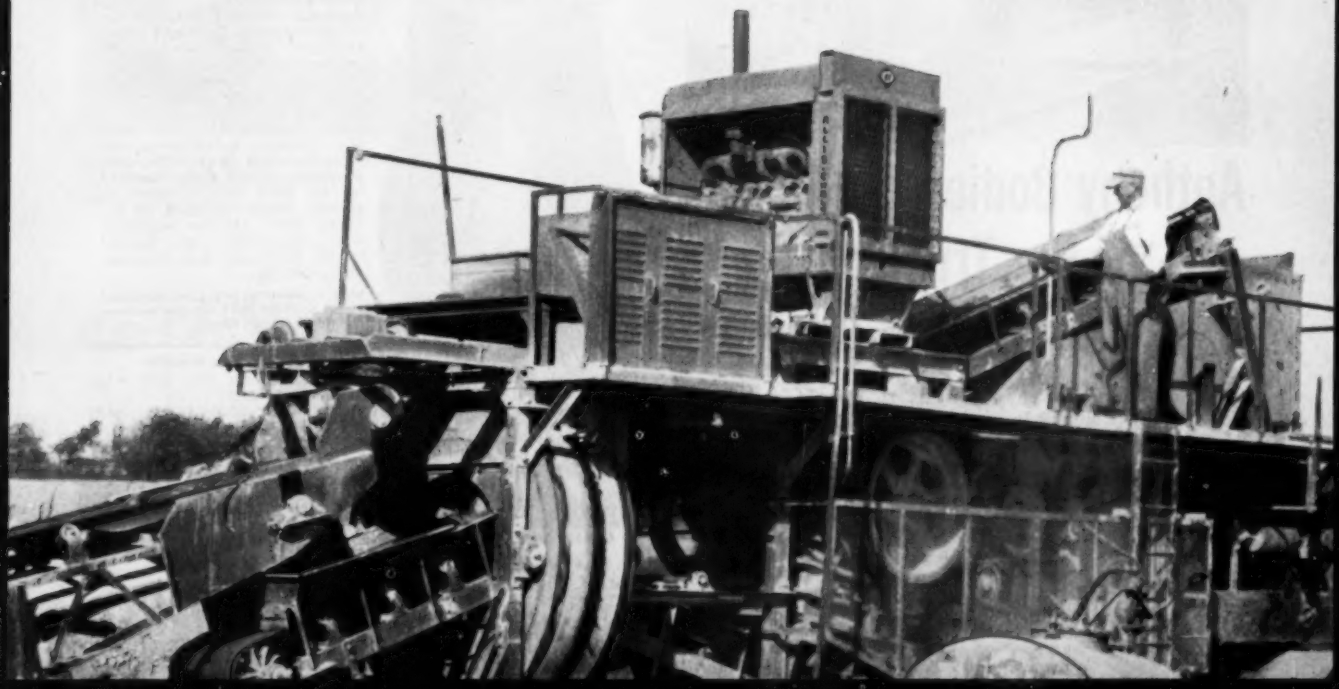
*Grinding Balls*

**SHEFFIELD DIVISION** ARMCO STEEL CORPORATION SHEFFIELD PLANTS: HOUSTON • KANSAS CITY • TULSA

EXPORT REPRESENTATIVES, THE ARMCO INTERNATIONAL CORPORATION, MIDDLETOWN, OHIO

"I like it the best of any engine we have had—wish we had one on the shovel," says the job superintendent about the Allis-Chalmers 6DA-844 diesel powering this crusher.

## With 30 to 50% fewer moving parts, this Allis-Chalmers diesel...



## ...PUTS MORE ROCK THROUGH THE CRUSHER

**THERE IS UNUSUAL SIMPLICITY** in Allis-Chalmers engines. The 6DA-844 diesel shown working above, for instance, *has 30 to 50 percent fewer wearing parts than competitive engines!*

**THAT MEANS LESS WEAR . . . LESS THAT CAN GO WRONG** when parts are fewer and stronger. Your equipment keeps working; you get more rock through the crusher.

**MORE POWER GOES TO WORK** with Allis-Chalmers engines — not only because there are fewer moving parts, but because more efficient combustion means maximum power from the fuel.

You can have this simplicity, economy and durability in Allis-Chalmers engines of *any* size or type, 9 to 516 hp — *any* fuel, LP or natural gas, gasoline or diesel — for *any* application. See your Allis-Chalmers dealer for full information. Allis-Chalmers, Buda Division, Milwaukee 1, Wisconsin. BC-7

**ALLIS-CHALMERS** *Engineering in Action*

# Anthony Bodies Do Almost ⅔ of the Trucking for 236 Mile Kansas Turnpike

**. . . haul extra payloads to help finish super highway in record time of 22 months!**

The giant Kansas Turnpike was scheduled to open for public traffic on October 15, 1956. As 1956 began, actual completion of the 4-lane, divided highway lagged 23.5% behind schedule, With Anthony Dump Bodies doing the lion's share of the trucking, the race for time began. It was during this period that the extra payload hauled on every trip by Anthony Bodies really counted. The Teleramic design of Anthony Hoists paid off in fewer time-consuming stops for service. On October 25, only 10 days after the scheduled opening, the super Kansas Turnpike was officially opened to traffic!

Anthony Teleramic Hoists and Bodies are lighter in construction.The Hoist is in an extreme forward position with more of its weight on the front axle. For these reasons, Anthony Dump Bodies haul extra legal payloads which can mean savings in time and increases in profits . . . on your jobs, too!

**Buy The Dump Body That Has The Service**

Over 100 Anthony Distributors are located nationwide. At least one is convenient to you . . . ready to give immediate service on all Anthony equipment. Complete descriptive literature is now available on Anthony Teleramic Hoists and Dump Bodies. No obligation, of course.

**The Teleramic V Seal Hoist Is A Major Factor In Frameless Trailer Success**

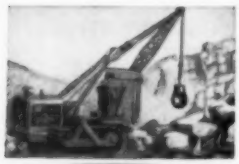
Proven "V" seal packing is only one of many quality features in the Teleramic Hoist design. Because the dry operating "V" seal is self-adjusting, repacking or manual adjustment of the Teleramic Cylinder is very rarely needed. "Truss rings" encircle and reinforce the ends of each cylinder tube to prevent "flaring". Extra long bronze bearings and long overlap of the cylinders help keep them perfectly aligned.

WRITE 1755 BAKER STREET

**ANTHONY COMPANY,** STREATOR, ILLINOIS

# LOW COST POWER

**For Fast "Secondary Breakage"**



## FREDERICK *CAST SEMI-STEEL* DROP BALLS

Tough, rugged Frederick Drop Balls give you crushing power where you want it, when you want it . . . cut down expensive drilling or blasting . . . give long, economical service with little or no maintenance. Exclusive "Pear shaped" design withstands greater impact—drops straighter. "E-Z Swing" recessed steel eye gives cable protection plus free swinging action. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Nickel alloy standard on all 4000 lbs. or over—or special alloys furnished on request. Balls can be furnished with replaceable pins. Special release hooks for free dropping also available.

**Write us today for prices and illustrated literature. Order Balls direct or see your nearest Equipment Dealer.**

| | Wide Range of Sizes and Weights: | | | | | | |
|---|---|---|---|---|---|---|---|
| Pear shape (lbs.)..... | 1500 | 2000 | 3300 | 4000 | 5200 | 6500 | 8000 |
| Ball shape (lbs.)..... | 500 | 1000 | 2000 | 5200 | | | |
| Spherical shape (lbs.)..... (for magnet use) | 470 | 950 | 1650 | 2400 | 3000 | 3700 | 5400 |

**FREDERICK IRON & STEEL, INC.**
FREDERICK *Established 1890* MARYLAND
Phone: MOnument 3-5111
CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

# AN ENGINEERED DESIGN

"Your best insurance for successful and maximum Production"

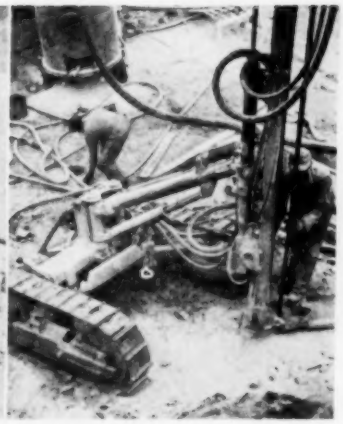
"Let Modern Engineering Work for You"

## *HACK ENGINEERING CO.*

**124 Wazee Market** **Denver, Colo.**
**TA. 5-5248**
**SAND & GRAVEL - DREDGING - PRE-MIX**
**Plants & Mills To Requirement**
*25 Years Experience*

There is no fussing with time consuming hoists and wire rope to spot this drill.

The big savings are in speed of set-ups and maneuverability. Set-up time is not production time.

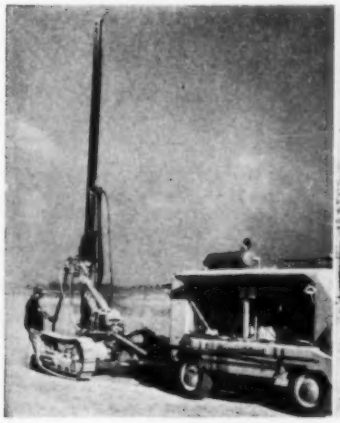


Convenient controls, reverse and release rotation make for fast and easy steel changes.

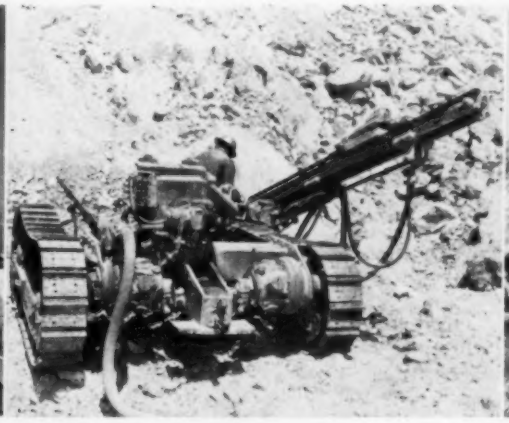
# the NEW Ingersoll-Rand CRAWL-IR MOST FULLY MECHANIZED CRAWLER DRILL EVER DEVELOPED

No other crawler drill is so fully powered — so fast and easy to setup — so safe and convenient to use. It will drill horizontally, vertically, or at any angle, with all boom and tower motions controlled hydraulically at the touch of a throttle.

The CRAWL-IR tows its own air power up slopes or over rough terrain. Heavy duty air motors propel the rugged knee-action crawlers. Call your I-R man or write for bulletin 4189.



The CRAWL-IR is not dependent on other equipment and men to move its air power—it tows its own.



Here is a graphic example of complete flexibility—toe holes out over the side of the crawler.

Sound design, convenience of controls and rugged construction give you all you could ask for in a crawler drill.

*a Constant Standard of Quality*

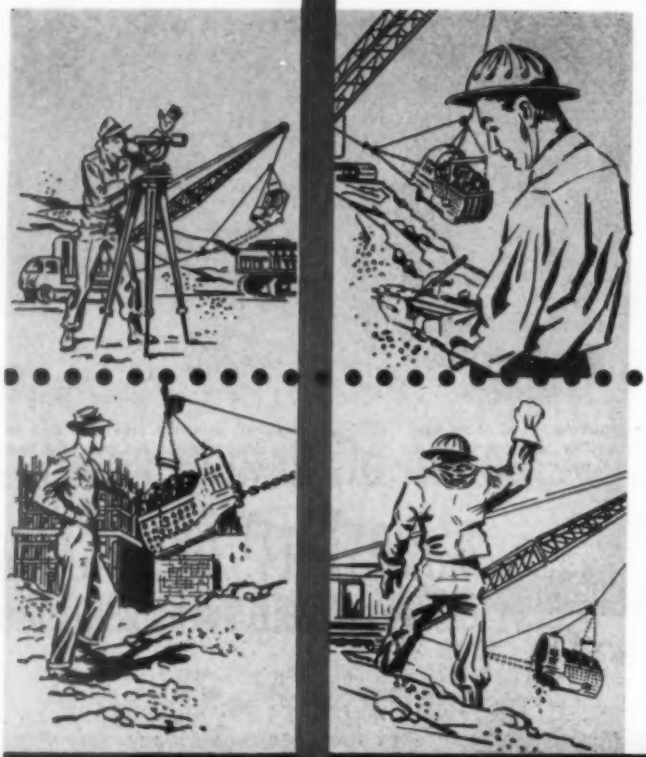
**Ingersoll-Rand**

11 Broadway, New York 4, N. Y.

CARSET JACKBIT

5-626

**FOR A PACE-SETTING DRILLING COMBINATION, POWER THE CRAWL-IR WITH A GYRO-FLO COMPRESSOR.**



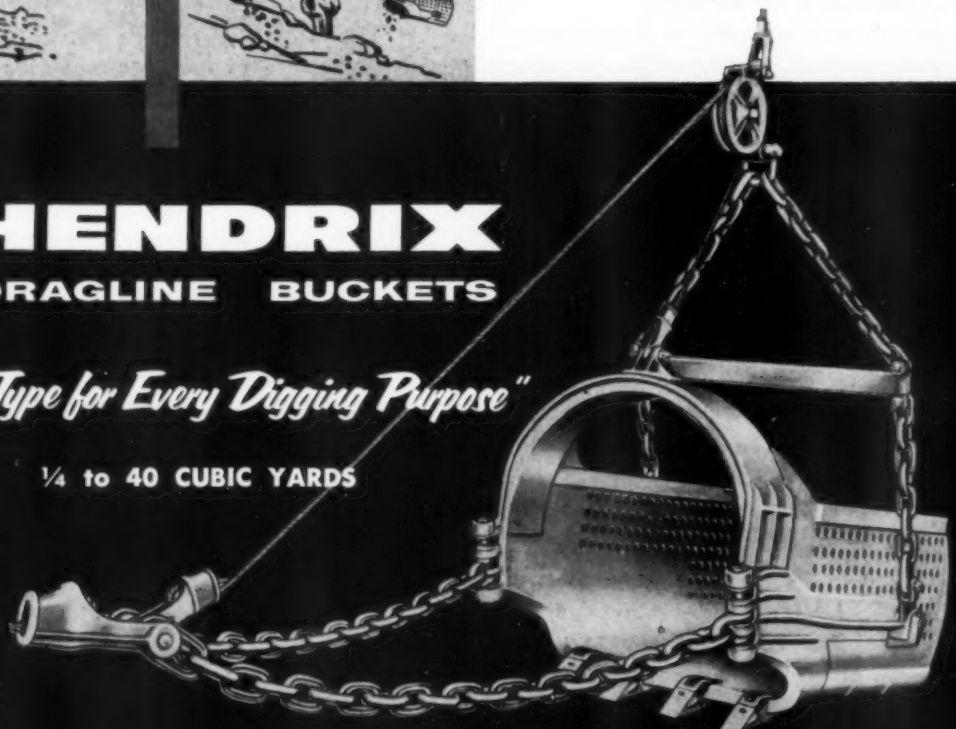
## Engineered for today's greater production demands!

# HENDRIX

## DRAGLINE BUCKETS

*"A Type for Every Digging Purpose"*

¼ to 40 CUBIC YARDS



*All Hendrix Buckets available without perforations*

Hendrix Lightweight DRAGLINE BUCKETS

**HENDRIX MANUFACTURING CO., Inc.**

**MANSFIELD, LOUISIANA**

# Why should you pay

## for top quality in "Commercial Grade" Roller Bearings . . . AND NOT GET IT?

It's *wasteful* to pay for quality you don't need. It's *negligent* to pay for quality you don't get.

From the simplest steel-cage type to the finest segmented-retainer type, Rollway "commercial grade" Tru-Rol Roller Bearings incorporate as closely as possible design and construction principles found normally in a Rollway maximum-type precision bearing.

Take the segmented-type Tru-Rol for example. Each deep-section separator segment is formed to fit the curvature of the roller. Each roller has a separator segment to keep it in accurate alignment. And each roller is crowned to distribute load evenl along the full length of the rolle

That's a lot different from small-diameter, unground spacers staggered at unequal intervals, resulting in rollers rubbing in opposed-motion, and non-uniform roller distribution that can set up out-of-balance vibration and "pulse".

Let a near-by Rollway Service Engineer consult with you on your bearing problems. No charge. No obligation. Just write us. Rollway Bearing Co., Inc., Syracuse, N. Y., *manufacturers of a complete line of radial and thrust cylindrical roller bearings.*

Cutaway view of Rollway Tru-Rol® segmented-retainer roller bearing . . . one of three distinct types of Tru-Rol bearings available.

ENGINEERING OFFICES: SYRACUSE • BOSTON • CHICAGO • DETROIT • TORONTO • PITTSBURGH • CLEVELAND • MILWAUKEE • SEATTLE • HOUSTON • PHILADELPHIA • LOS ANGELES • SAN FRANCISCO

### *Check This List* AND BE SURE!

**Retainer Operation**

☐ Is the retainer roller-supported, to reduce sliding friction?

**Retainer Construction**

☐ Is the retainer strong enough to withstand shock loads and sudden reversals?

*(A Rollway segmented-type steel retainer, such as that illustrated, is the strongest, most durable available in commercial grade bearings.)*

**Roller Spacing**

☐ Are all rollers equally separated, or do some rub against each other in opposed-motion friction?

☐ Are rollers distributed evenly to prevent "pulse" and vibration?

**Roller Construction**

☐ Are the rollers crowned for optimum load distribution?

**For Top Quality In Every Detail Buy Tru-Rol and Be Sure!**

**500′ (IN 30′ DEPTHS) PER 8-HOUR SHIFT** in limestone, with 2 heavy-duty wagon drills and efficient Jaeger "600" air power. Drilling is done in 2 lifts, first to 20′, then a final 10′ lift. Lewisburg Limestone Co., Lewisburg, Tenn.

# Jaeger 600 "far more efficient", *says quarry operator*

**Powers 2 heavy-duty drills averaging 500′ per shift in limestone; engine speed under 1650 rpm**

It takes plenty of constant 100-lb. air to power 2 heavy-duty wagon drills logging a fast 500′ in limestone, each 8-hour shift. This Jaeger "600" rotary does the job for Lewisburg limestone, with ample air reserve, at easy, fuel-saving speeds that never reach 1650 rpm. This economical, slow-running performance cuts fuel costs, saves wear and tear on engine and compressor. "Far more efficient than the compressor it replaced," reports Lewisburg Limestone.

A Jaeger Roto "600", using the same Model 6-71 GM diesel engine, produces the same 600 cfm of air as other "600" compressors at 100 to 150 rpm slower speed (1650 rpm instead of 1750 or 1800). You cut fuel costs, reduce fpm of engine piston travel and save up to 9000 revolutions every hour you operate a Jaeger "600". Smaller Roto Air-Plus® units (125, 250 and 365 cfm) have the same slow-speed, high-efficiency performance.

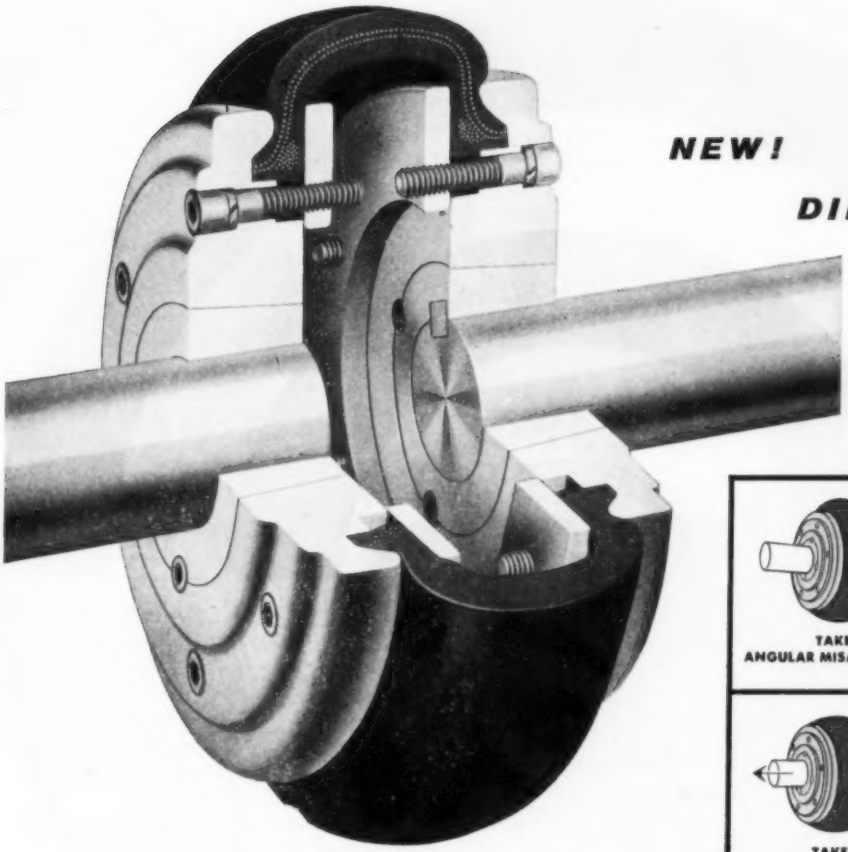
It will pay you to get full details and prices from your Jaeger distributor — or ask us to send Catalog JCR-5.

**MAKING LITTLE ONES OF BIG ONES:** Jaeger "125" rotary keeps this hand-held rock drill operating at full efficiency by producing 125 cfm of 100 psi air at only 1700 rpm, instead of the usual 1800. You save the difference, in fuel and wear.

## THE JAEGER MACHINE COMPANY

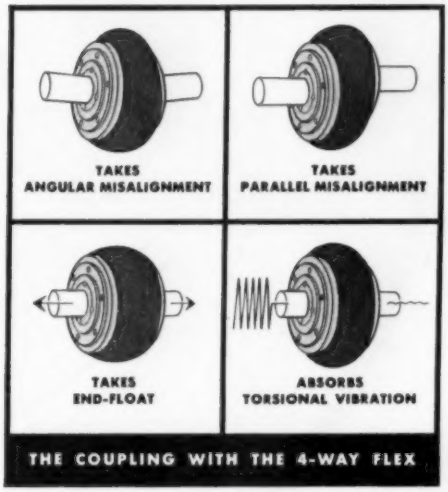
**602 Dublin Avenue, Columbus 16, Ohio**

PUMPS • CONCRETE MIXERS • SPREADERS • FINISHERS • TRUCK MIXERS



**NEW!**

**DIFFERENT!**




**Announcing**

# Para•flex

## FLEXIBLE CUSHION COUPLING

THIS coupling "swallows up" shaft misplacements. It automatically compensates for end-float, parallel misalignment, angular misalignment *or any combination of all three.* Moreover, it cushions the stresses of shock loads. And it absorbs torsional vibration—reducing noise and protecting machinery from vibration's destructive forces.

Here is a new type of performance—made possible by the development of a tire-like flexing element. Synthetic tension members, bonded together in rubber, give this element the stamina and dependability of modern, high-speed, high-load, shock-absorbing truck tires—and the ability to respond magically to all manner of changing shaft conditions.

Para-flex takes minimum space on the shaft. Mounting is simplified through the use of standard Taper-Lock bushings—no reboring, no machining. Safety is promoted by flush design; there are no protruding parts. No lubrication is required, no periodic inspection. And since the flexible member is molded with a transverse split, it can be replaced *without moving either the driver or driven machine.*

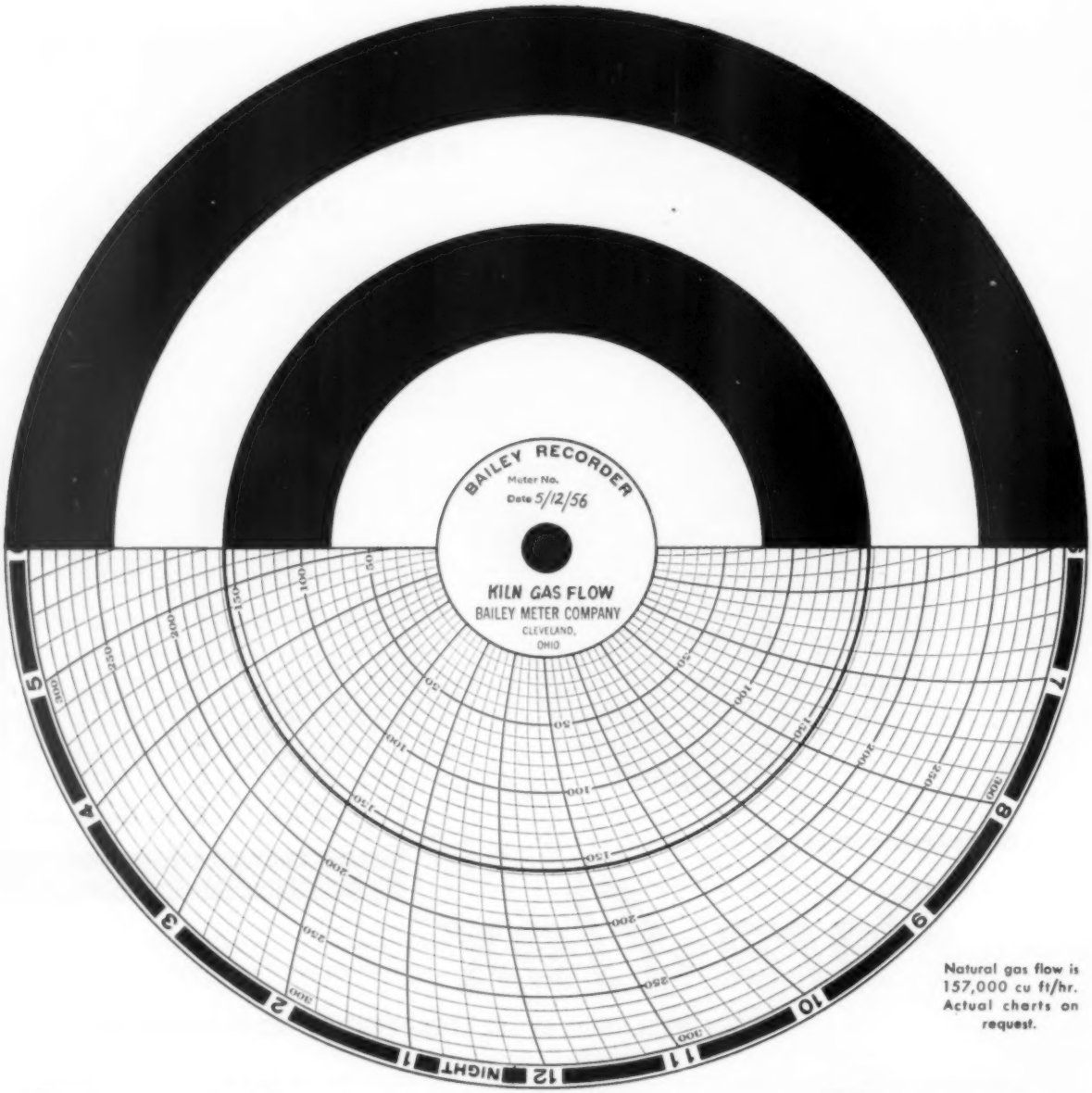
Para-flex Couplings are stocked by Dodge Distributors in popular transmission sizes. They are available from factory stock in capacities up to 600 hp at 900 rpm. Call your distributor for early delivery to *make your own test.* You'll witness something revolutionary!

DODGE MANUFACTURING CORPORATION, 4000 Union, Mishawaka, Ind.

**DODGE**

*of Mishawaka, Ind.*

**CALL THE TRANSMISSIONEER,** your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your classified telephone directory—or write us.




Natural gas flow is 157,000 cu ft/hr. Actual charts on request.

# More Cement—Fewer Upsets

## with bull's-eye performance

• Bailey Automatic Kiln Control keeps your kiln at peak performance for days at a time with little or no supervision. The necessary know-how for the proper selection and application of instruments and controls by Bailey Engineers has been derived from experience, tests, and successful installations. Kiln temperatures, feed, draft, fuel, and speed are kept "in the groove" at maximum kiln capacity. Recorders show burner operators visual evidence of *bull's-eye* performance.

Let one of our application engineers help you plan for *bull's-eye* operation. Write for KILN CONTROL FOLDER complete with case histories and charts. C-10

***Instruments and controls for power and process***

**BAILEY METER COMPANY**

***1051 IVANHOE ROAD • CLEVELAND 10, OHIO***

**In Canada—Bailey Meter Company Limited, Montreal**

BAILEY METERS

**NEW TL-20D TRACTO-LOADER®**

**2-cu yd • 4-wheel drive 100 hp — 22,100 lb — diesel**

Exclusive *single lever* control of full power-shift transmission. You go into and out of any gear — forward or reverse — while moving, by shifting only *one lever*.

**RUGGED TL-12 TRACTO-LOADER®**

**1⅛-cu yd • 4-wheel drive**
**63 hp — 12,100 lb — gasoline**
**77 hp — 12,300 lb — diesel**

Simple, Clutch-Type Transmission — you push a lever to go forward, pull it for reverse.

# YOU CAN'T GO WRONG with the RIGHT LOADER — BACKED BY A GOOD DEALER

Choose the loader to fit your job from TRACTOMOTIVE'S complete line . . . sold and serviced exclusively throughout the world by Allis-Chalmers construction machinery dealers.

**FIVE MODELS**

4-wheel drive and 2-wheel drive
½ to 2-cu yd
gasoline and diesel

**LOAD FAST—WORK FAST—EARN MORE** with Tip-Back Bucket • Smooth, Hydraulic Torque Converter Drive • Timesaving Shift • Power Steering • Extra-Long Reach • Strong Construction • Unit Assembly for easy servicing • Famous Allis-Chalmers engines . . . many other advantages.

**HEAVY-DUTY TL-11 TRACTO-LOADER®**

**1⅛-cu yd • 2-wheel drive**
**63 hp — 11,300 lb — gasoline**
**77 hp — 11,500 lb — diesel**

Clutch-Type Transmission. 4-wheel drive ruggedness with 2-wheel drive maneuverability.

**ALL-AROUND TL-10 TRACTO-LOADER®**

**1-cu yd • 2-wheel drive**
**63 hp — 11,900 lb — gasoline**

Clutch-Type Transmission. An ideal inside and outside machine.

For Confined Areas —

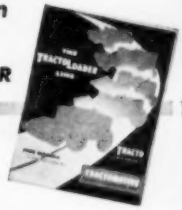
**TL-6 TRACTO-LOADER®**

**½-cu yd • 2-wheel drive**
**33.7 hp — 6,100 lb — gasoline**
**38 hp — 6,500 lb — diesel**

Clutch-Type Transmission. Short turning radius — easily gets around in close quarters.

**TRACTO** — *a sure sign of modern design*

***SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER***



*Send For Free Descriptive Literature*

# TRACTOMOTIVE

TRACTOMOTIVE CORPORATION, DEERFIELD, ILLINOIS

TRACTOMOTIVE CORPORATION, Dept. PQ
Deerfield, Illinois

☐ Please send Tracto-Loader Catalog
☐ Have salesman call • Interested in Model .....

Name .....
Title .....
Company .....
Address .....
City ..... State .....

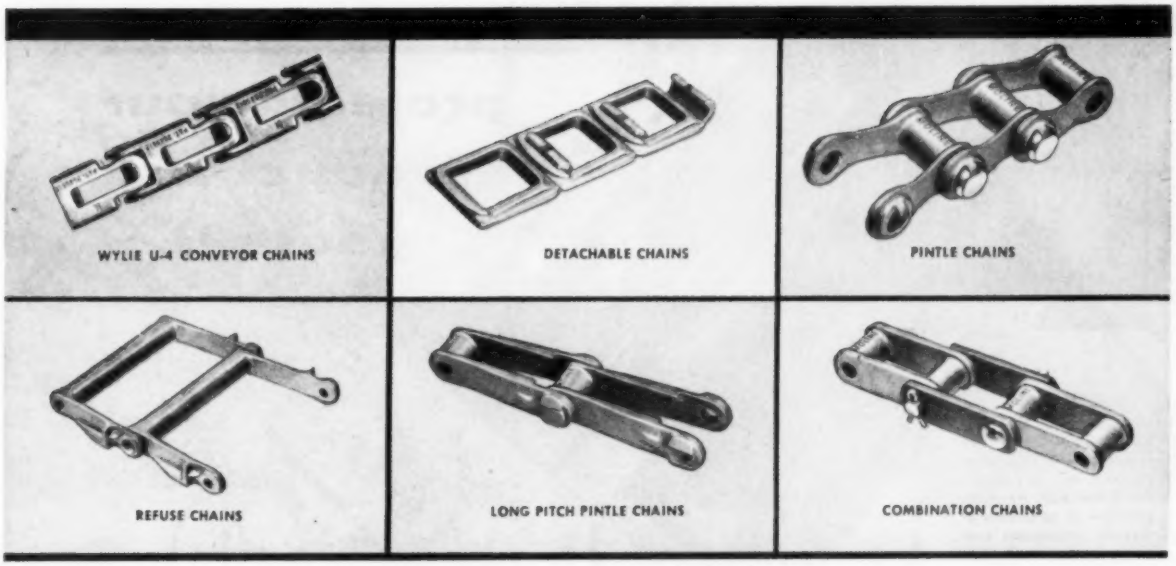
# Roebling Royal Blue Wire Rope will **wear** and **wear** and **wear**!

This working quality means longer service life on *your* job. Add to this the fact that Royal Blue is stronger than the strongest rope you have been using and you have two excellent reasons why it has enjoyed faster acceptance than any wire rope in Roebling's history. Your distributor or Roebling Sales Office will give you the complete story, or contact John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

**ROEBLING**

*Distributors, Branches and Warehouses Throughout the Country—Subsidiary of The Colorado Fuel and Iron Corporation*

# Moline *makes just one thing– the world's finest Malleable chain*

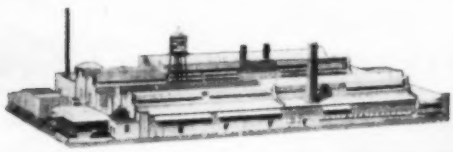



## *for conveying, elevating and power transmission*

SPECIALIZATION makes the difference in Moline Malleable Chain. More than 60 years' concentration on the production of chain makes Moline the chain experts. Moline engineers and technicians confine their efforts to improving chain design and manufacture and to the refinement of production facilities within Moline's two large plants.

That's why you can be absolutely certain that every link bearing the name Moline will give maximum performance and long life... in conveying, elevating and power transmission services.

Specify Moline Chain, malleable or promal, for your equipment. Write today for catalog.



**THE HOME OF TRIPLE TESTING!**

This completely modern foundry—one of Moline's two large plants—houses fully mechanized production lines and Moline's famous triple testing facilities. Link by link, strand by strand, Moline chains undergo rigid physical testing. They are visually inspected and gauged by experts before being assembled, then stressed to proof strength and shock tested for soundness.

Moline Chains

MOLINE MALLEABLE IRON CO.
ST. CHARLES, ILLINOIS

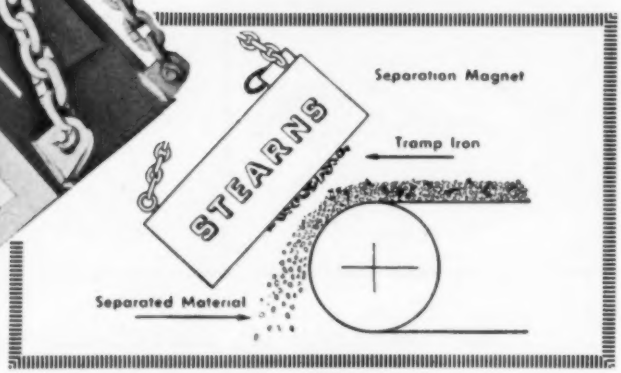
LEADERS FOR 60 YEARS

*Specializing in the manufacture of chain*

# STEARNS SUSPENDED MAGNET

## stops iron junk, protects your product and your plant

Magnet can be suspended at head pulley of conveyor, in position shown, or anywhere along the belt. At right, principle of operation of Stearns rectangular suspended magnet. Optional cable suspension for easier control of angle.




A Stearns rectangular suspended magnet gives you positive and efficient removal of tramp iron — even on heavily loaded, fast conveyor lines.

The Stearns rectangular magnet design permits its powerful, deep-penetrating magnetic force to remove tramp iron effectively from entire width and depth of material burden at belt speeds in excess of 600 fpm. The magnet operates efficiently where other equipment can't do the job.

### Greater Flexibility

Stearns suspended magnets overcome space limitations because they can be placed over head pulleys or anywhere along the belt. Some are installed to remove tramp iron before material moves onto the conveyor—thus safeguarding the belt and other processing equipment from damage.

Stearns suspended magnets are economical to install and operate. There's no need to modify your existing conveyor systems.

### Standard or Custom-Built

Magnetic specialists at Stearns design and build rectangular or circular suspended magnets, electro or permanent magnetic pulleys in standard sizes — or to your specifications. Get complete details from your Stearns representative.

### Check these advantages:

- *All-welded, moisture-proof construction*
- *No moving parts that require replacement*
- *Single-coil construction for magnetic field stability*
- *New design of magnet coil enclosure affords maximum heat dissipation*
- *Vacuum-impregnated windings for long life, dependable operation*

**FREE BULLETIN AIDS SELECTION**

Send today for new bulletin describing five major types of Stearns suspended separation magnets. Gives you complete specifications and simple method of selecting the proper size and type of magnet for your application. Ask for Bulletin 1031-N.

**STEARNS MAGNETIC PRODUCTS**

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY • VALPARAISO, INDIANA

635 South 28th Street • Milwaukee 46, Wisconsin

## FEEDING FLOATING PLANT

# Dragline Speeds Flow of Sand and Gravel for Virginia Firm

This Marion dragline equipped with 4½ yard bucket helps a Virginia firm produce a steady flow of sand and gravel to supply its many outlets in the Middle Atlantic area.

The 111-M teams up with a floating plant and barges to chew away on the company's vast reserves in an efficient operation.

The 111-M is ideally suited to this assignment. The 4½ yard bucket and fast cycle time keep the processing plant hopper full. Its 80-foot boom keeps the machine safely away from the bank edge. Diesel mobility plus electric swing on the 111-M mean the elimination of friction swing clutch heat problems.

In dragline service, booms are available to 100 feet, buckets to 5 cubic yards. With any front end combination, the 111-M is a real producer. The 111-M diesel with electric swing does many types of big jobs well, and offers significant operating advantages. Let your nearest Marion Distributor tell you more about this outstanding Marion and the jobs it is doing.

**Whatever your job requirement, there is a Marion machine of the right size and type for greatest efficiency**

| MACHINE | Shovel Capacity | AVAILABLE AS . . . Hoe | Crawler Crane | Truck Crane | Special Crane |
|---|---|---|---|---|---|
| 35-M | ¾ | Yes | Yes | Yes | — |
| 43-M | 1 | Yes | Yes | Yes | — |
| 362 | 1½ | Yes | Yes | — | Yes |
| 87-M | — | — | Yes | — | Yes |
| 93-M | 2½ | Yes | Yes | — | Yes |
| 101-M | 3 | — | Yes | — | — |
| 111-M | 4 | — | Yes | — | — |

MARION **POWER SHOVEL COMPANY**
*A Division of Universal Marion Corporation*
*Marion, Ohio*

**SEND ME** information about **MARION** ..... yard shovels, ..... yard hoes and ..... ton cranes (☐ crawler mounted ☐ truck mounted). ☐ Have a salesman call.

NAME ..... TITLE .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

# BEAUTY...OR BEAST?

We'd be the last to claim that Amsco® Dippers have any inherent glamour. That's why we induced the pert 115-pound* blond to pose in one of our 7-yd. dippers at a recent trade show. Got a lot of attention, too!

But we know that experienced operators *specify* these all-cast Manganese Steel Dippers because they're real "beasts"—when it comes to strength and ruggedness. By way of proof, glance at the other photo. It shows a 9-yd. Amsco Dipper hoisting a 60 to 70-ton* rock out of the St. Lawrence Seaway Channel. There's plenty more proof available, too—on the extra strength, digging ability and long life of Amsco Dippers. That's why they're the number one original-equipment choice on most leading makes of power shovels!

Consult your equipment manufacturer, or write us direct for new booklet on *Amsco Power Shovel Equipment*, giving detailed reasons why Amsco Dippers are real "beasts" when it comes to rugged digging work.

*Estimated

AMERICAN Brake Shoe COMPANY

# AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

# LOOK TO DAYBROOK

## . . . For a New Standard of Ruggedness on the "Rock Routine"!

The truck above was being backed to the edge of a quarry bank. The bank gave-way, causing the truck to roll end-over-end, coming to rest in an upside-down position. Within a few seconds after this picture was taken, the truck, equipped with a Daybrook Boulder Dam Style Dump Body, was righted and work resumed.

Daybrook Boulder Dam Style Dump Bodies feature sturdy wrap-around body construction—rounded inside corners for fast, clean dumping.

Daybrook Hoists are available in conventional arm, direct-lift, telescopic, and "Power-Up—Power-Down" models.

Daybrook builds a complete line of rugged hoists and bodies—well known for dependability in quarry operations.

Ask your distributor about Daybrook's built-in ruggedness on the "rock routine."

Daybrook Boulder Dam Style Body Model 1052 with Daybrook Speedlift Hoist Model 77-C-138.

SEND DAYBROOK LITERATURE CHECKED BELOW: 41

ROCK BODIES—HOISTS ☐ POWER LOADER ☐ EXCAVATOR BODIES—HOISTS ☐ POWER GATE ☐

Sign below, attach coupon to letterhead, and mail in envelope.

Name

**DAYBROOK** *Speedlift*® **TRUCK EQUIPMENT**

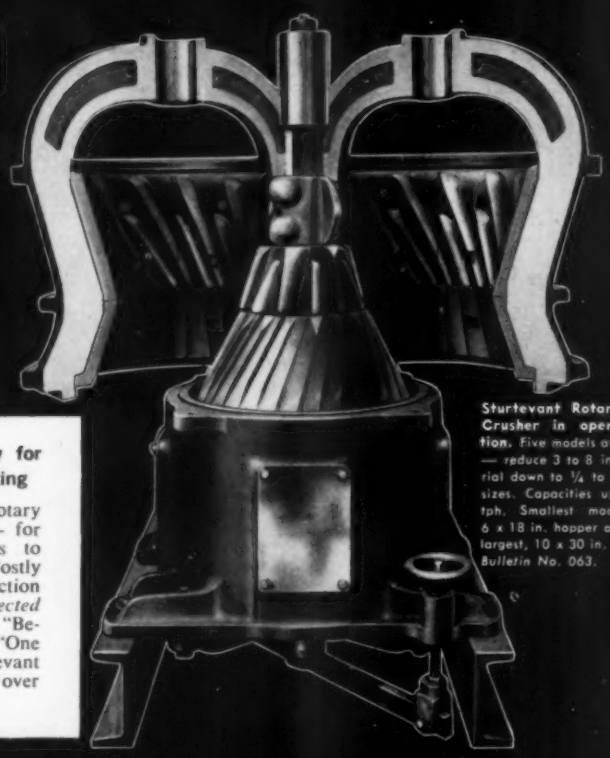
LAYCO

**DAYBROOK HYDRAULIC DIVISION**
*L. A. YOUNG SPRING & WIRE CORPORATION*
**BOWLING GREEN, OHIO**

# PRODUCTION ALWAYS ON SCHEDULE

*Thanks to*

## "OPEN-DOOR" DESIGN



**Sturtevant Rotary Fine Crusher in open position.** Five models available — reduce 3 to 8 in. material down to ¼ to 1¼ in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. *Request Bulletin No. 063.*

**"One Man, One Minute" Accessibility for Inspection, Clean-outs, Trouble-shooting**

One man can swing open a Sturtevant Rotary Fine Crusher in a matter of minutes — for inspection and maintenance — thanks to Sturtevant's unique "Open-Door" design. Costly downtime is cut to a minimum, production kept on schedule — *even when the unexpected happens.* Little wonder that users say: "Because of their rugged construction and "One Man, One Minute" accessibility, Sturtevant machines give us *lower* operating costs over *more* years."

## STURTEVANT ROTARY FINE CRUSHERS REDUCE SOFT TO SEMI-HARD MATERIALS FASTER, MORE ECONOMICALLY

**For uniform crushing** of soft (clay, charcoal) to moderately hard materials (softer limestone, cement clinkers), the Sturtevant Rotary Fine Crusher is practically non-clogging — much faster than other machines, less costly to operate.

**Smooth production flow.** The single turning of a hand wheel regulates the output size (from ¼ to 1¼ in. on largest model) — provides a uniform product, dustless operation, steady output for greatest production efficiency.

**A lifetime of low-downtime service.** Built into Sturtevant Rotary Fine Crushers is Sturtevant's 83 years of successful engineering of dry processing units and equipment. Rugged construction, plus easy accessibility provided by Sturtevant's unique "Open-Door" design, assures more output per machine year.

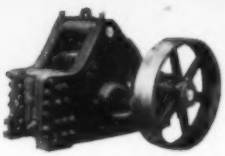
*Write today, Address: Sturtevant Mill Company, 104 Clayton St., Boston 22, Mass.*

# STURTEVANT

## *Dry Processing Equipment*

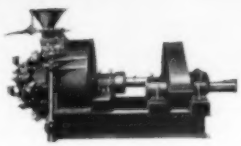
**The "OPEN-DOOR" to *lower* operating costs over *more* years**

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS



**JAW CRUSHERS**

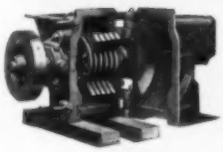
Reduce coarse (5 in. largest model) to fine (⅛ in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smaller sizes operate on double cam principle—crush twice per energy unit. *Request Bulletin No. 062.*



**RING ROLL MILLS**

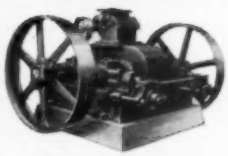
Reduce hard or soft 1½ in. and smaller material to from 6 to 200 mesh. Grind only — no screens. Capacities of 3 models range up to 18 tph, depending on model and material. Ring diameters and faces 24 x 7 in.; 45 x 8 in.; 44 x 14 in. *Request Bulletin No. 079.*

**ALL STURTEVANT MACHINES ARE DESIGNED TO OPERATE ADVANTAGEOUSLY IN "UNITS"**



**HAMMER MILLS**

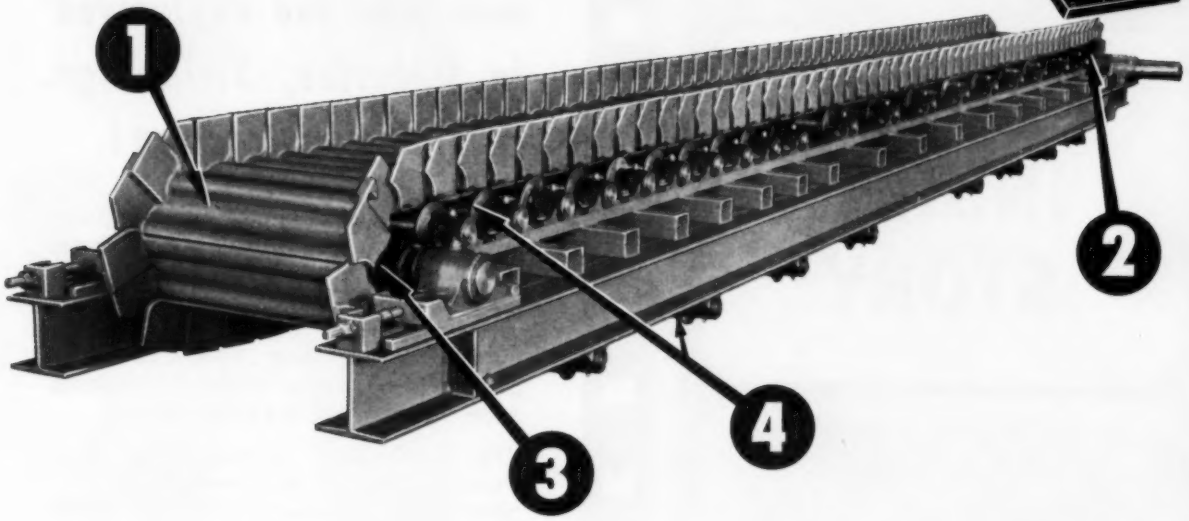
Reduce to 20 mesh. Swing-Sledge Mills crush moderately hard material up to 70 tph. Hinged-Hammer Pulverizers crush softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30½ in. Four Hinged-Hammer Pulverizers from 12 x 12 in. to 12½ x 24 in. *Request Bulletin No. 084.*



**CRUSHING ROLLS**

Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls for automatic adjustment in operation; Plain Balanced Rolls; Laboratory Rolls. Recomended for 3 to 1 reduction. *Request Bulletin No. 065.*

# WHERE WEAR COUNTS!




# TISCO® PAN FEEDERS

❶ **FEEDER PANS** — Hammered by tons of heavy rocks and ore every minute, but tough TISCO Manganese Chrome Steel pans lick impact and abrasion, outwear ordinary pan feeders 5 to 1.

❷ **HEAD SPROCKETS** — One break-down here flattens production. For dependable durability Manganese Steel does the job.

❸ **IDLERS** — Manganese Steel in this vital part keeps idlers busy, smooth running.

❹ **ROLLERS** — When each roller must continually shake off shocks and abrasion nothing wears like Manganese Steel.

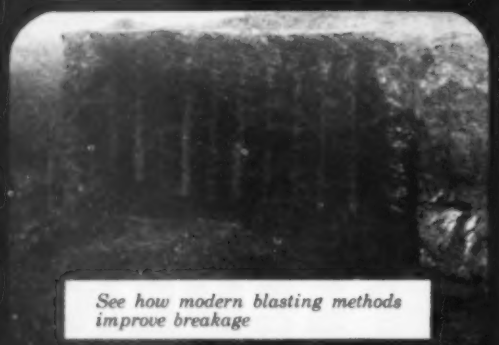
Picture tons of heavy, abrasive material smashing down on this TAYLOR-WHARTON Pan Feeder, month after month without a breakdown. The reason — tough TISCO Manganese Steel soaks up shock and abrasion, keeps production climbing, maintenance down. For further information write to:

## TAYLOR-WHARTON CO.

**DIVISION OF HARSCO CORPORATION**
**Established 1742**
**HIGH BRIDGE 3, NEW JERSEY**
**Cincinnati, O. — Birmingham, Ala. — Easton, Pa.**

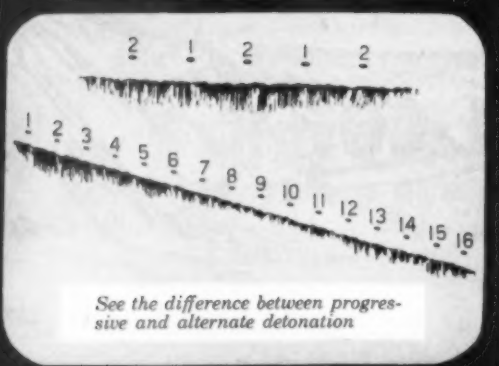
## TO HELP YOU BLAST WITH GREATER ECONOMY

# *The* INSIDE STORY



*See how modern blasting methods improve breakage*

*See how the point of initiation affects rock movements...controls throw*




*See the difference between progressive and alternate detonation*

## *Don't miss this movie for men who use explosives in Quarries, Strippings and Construction!*

Here is a motion picture that gives the facts on modern blasting techniques. It shows how you can save money through better, more complete fragmentation . . . how you can increase safety by eliminating the need for secondary blasting . . . and how your public relations can be improved by holding noise and vibration to a minimum.

"*The Inside Story*" is prepared by Atlas Powder Company as a technical service. Show it to your organization for a better understanding of scientific blasting. It explains in detail how the point of initiation affects blasting results . . . how millisecond delay techniques and alternate velocity loading are used to gain maximum efficiency.

This information also makes "*The Inside Story*" well suited for showing at institute meetings and to other engineering groups.

*How to get the film.* Simply write us on your letterhead, telling us at what type of meeting you'd like to show "*The Inside Story*," and approximately when you'll need it. We'll try to ship a print to you well in advance of the date you select.

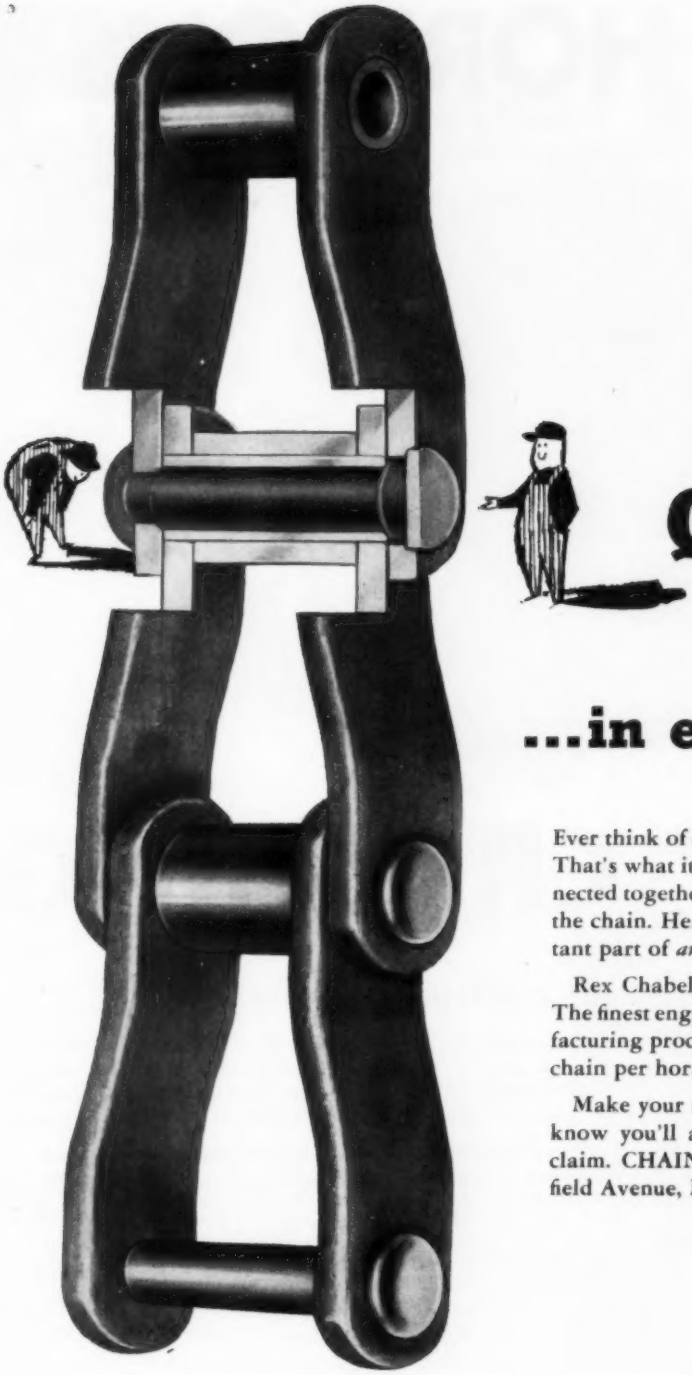
Ask also about other Atlas educational material such as the films, "*How to Handle Women and Explosives*" (for your safety meetings), and "*We're Blasting Near You*" (to show to your neighbors). And write for "*Better Blasting*," the informative Atlas newsletter on latest blasting materials and methods.

EXPLOSIVES DIVISION

**ATLAS POWDER COMPANY**

WILMINGTON 99, DELAWARE

*offices in principal cities*



REX®

# Quality

## ...in every pitch

Ever think of chain as a series of journal bearings? That's what it actually is—a series of bearings connected together. The better the pin joints, the better the chain. Here's a look inside at the most important part of *any* chain.

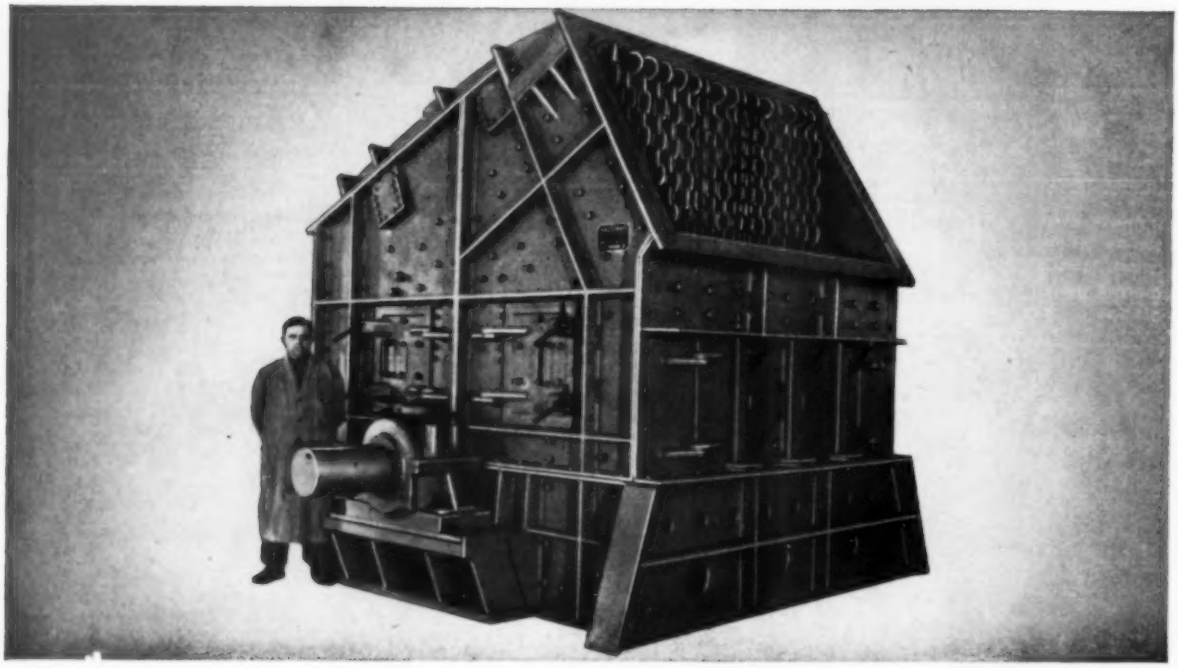
Rex Chabelco Drive Chains are precision built. The finest engineering, design, materials and manufacturing processes result in the best possible drive chain per horsepower dollar.

Make your next drive chain a Rex Chabelco. We know you'll agree it is every bit as good as we claim. CHAIN Belt Company, 4604 West Greenfield Avenue, Milwaukee 1, Wisconsin.

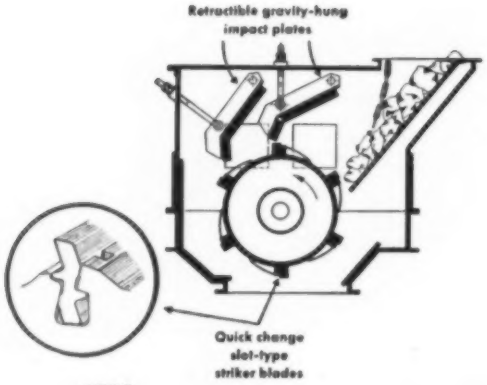
**CHAIN BELT COMPANY**

Milwaukee 1, Wisconsin

# WIDER HORIZONS



## FOR *IMPACT* CRUSHING




### RE-CRUSHING BY IMPACT

Re-crushing by impact represents a significant advance in the technique of aggregate production. With the ever increasing demand for the finer sizes—and the emphasis on ⅜" stone—the premium sizing of impact crushing is of the greatest importance.

The HAZEMAG impactor, equipped with "fineness-control", regularly re-crushes to 75-80% minus ½" and can be set still finer if desired. As is usual with impactors, the product is of cubical shape with "flats" eliminated.

Shown in photograph: HAZEMAG Impact Crusher, Model #AP5BR. Rated Capacity: 500 tons per hour.

OVER ~~1200~~ 1700 HAZEMAG IMPACT CRUSHERS NOW INSTALLED ALL OVER THE WORLD

**HAZEMAG** M·B·H· IMPACT CRUSHERS RAPID DRYERS

HAZEMAG

SALES AND ENGINEERING OFFICES THROUGHOUT THE WORLD

*IN CANADA*
HAZEMAG (CANADA) LTD.
310 Victoria Ave. - Suite 307-4
Westmount, P.Q., Canada

*IN THE U.S.*
RICHARD E. KLEINHANS
International Industrial Sales
122 East 42nd Street
New York 17, New York

*IN MEXICO*
DIESEL MEXICANA, S.A.
Reforma 20, Desp. 102,
Mexico D.F. City

Munster (Westf.) Germany

# Here's MORE efficient driver speed for HEAVY Loads

## ALLIS-CHALMERS TEFC Wound-Rotor MOTORS

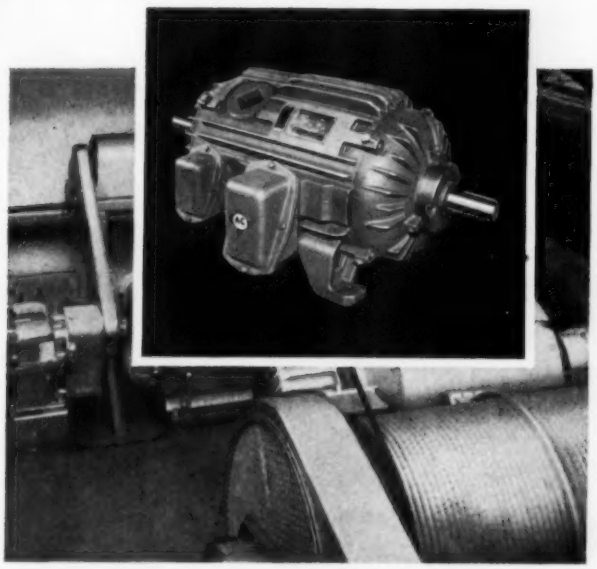
Where high inertia loads must be accelerated quickly and smoothly — yet power supply is limited — the Allis-Chalmers wound-rotor motor proves its efficiency . . .

High starting torque with this motor requires relatively low line-current. In addition, adjustable acceleration and running speed are possible through use of simple controls.

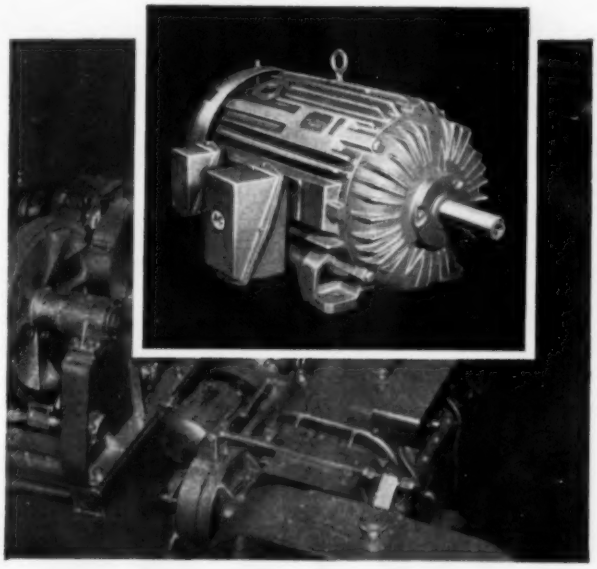
*Other features* of the TEFC wound-rotor motor include:

1. **Rib construction** provides ample cooling surface.
2. **Single enclosure** surrounds stator, rotor, slip rings, brushes and brush rigging. Gives maximum protection in moist, dirty, corrosive or hazardous atmosphere.
3. **Cast-iron frame** contributes rigid, distortion-free bearing support and keeps alignment true.
4. **Easy access** to collector rings and brushes permits on-the-spot inspection of brushes and commutators.

If you use hoists, lifts, cranes, conveyors, crushers or mills, find out more about the "MORE" in Allis-Chalmers wound-rotor motors. A-C motors also are available in various open types. Contact your nearby A-C sales office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



**For intermittent duty,** this totally-enclosed, non-ventilated model is available in frame sizes 284 to 505 inclusive. Above 505 frame, Allis-Chalmers offers its famous tube-type motor.



**For continuous service,** this tough, fan-cooled model is ideal. All enclosed motors can be furnished in standard enclosed or explosion-proof construction rated 55 C rise.

A-5180

# ALLIS-CHALMERS

*the big league ball player has his equipment custom-made because he gets something* **EXTRA**

**the profit-wise operator**

## BUYS TRAYLOR REDUCTION CRUSHERS for the same reason

Traylor Reduction Crushers are famous throughout the industry for the extra *production* and extra *profits* they put into mining operations. Traylor-made in ten sizes, with feed openings from 1½" to 22", Traylor Reduction Crushers provide capacities up to 590 tons per hour. For complete specifications write for Traylor Bulletin No. 11-120.

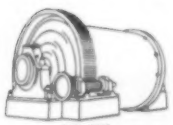
**TRAYLOR ENGINEERING & MFG. CO.**
**985 MILL ST., ALLENTOWN, PA.**
**Sales Offices:** New York—Chicago—San Francisco
**Canadian Mfr.:** Canadian Vickers, Ltd., Montreal, P.Q.

*the experts agree . . . there's nothing like*

# TRAYLOR-MADE

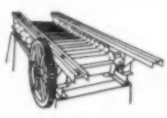
*equipment for peak performance*

A Traylor leads to greater profits


BALL MILLS

ROTARY KILNS

PRIMARY GYRATORY CRUSHERS


APRON FEEDERS

IMPACT CRUSHERS

SECONDARY GYRATORY CRUSHERS

# TORRINGTON *SPHERICAL ROLLER* BEARINGS

## This bearing can take thrust, too!

Design is the secret. TORRINGTON Spherical Roller Bearings are made with an integral center flange on the inner race. This assures *positive radial stability and accurate positioning of rollers* wherever high radial load and heavy thrust are encountered under conditions of misalignment.

From crushers to cranes, power shovels to pulverizers, you get long, maintenance-free operation, better performance in your equipment, more value from your bearing dollar when you specify these rugged dependable bearings.

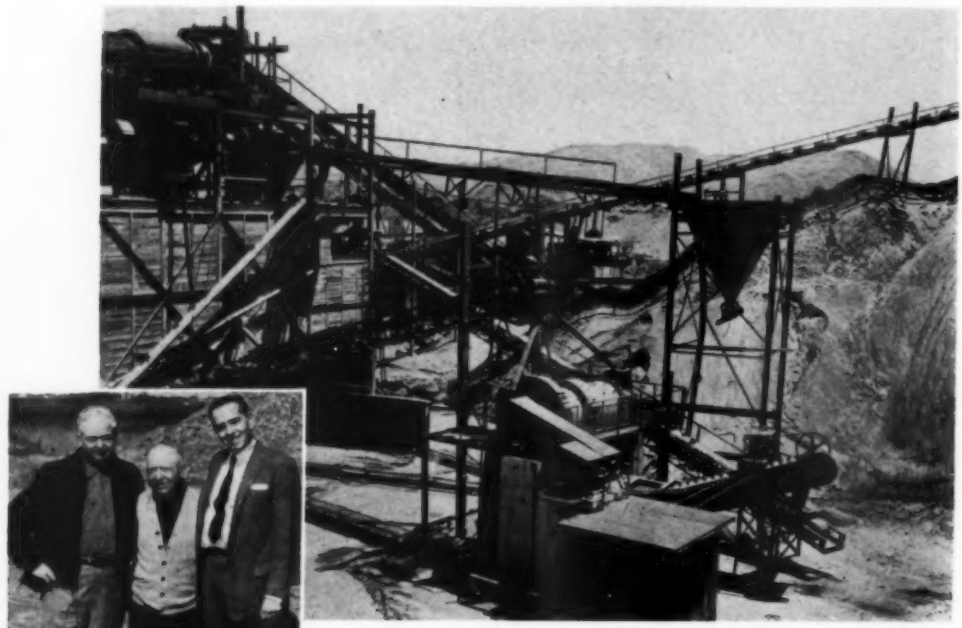
Prove to yourself that TORRINGTON design does make a difference. Next time specify TORRINGTON Spherical Roller Bearings. They're available with either straight or tapered bore, for shaft or adapter mounting.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
*District offices and distributors in principal cities of United States and Canada*

**TORRINGTON BEARINGS**
**Spherical Roller • Tapered Roller • Cylindrical Roller Needle • Ball • Needle Rollers**

# see what Marcy can do for YOU!

## Marcy Mill, Grinding Excess Material, Enables Petrillo Bros. to Meet Rigid Sand Specifications.



*5' x 10' Marcy Center Peripheral Discharge Rod Mill at Petrillo Bros., Inc., plant, Wilmington, Delaware. This installation was engineered by the A. R. Amos Co., Philadelphia, specialists in sand and gravel plants. Shown in small photograph are, left to right: Charles Petrillo, Sec.-Treas.; Louis Carbone, Supt.; and M. B. Hawes, A. R. Amos Co.*

In 1955 Petrillo Bros. found that their natural sand was deficient in fines and did not meet the rigid state specifications. To solve this problem the A. R. Amos Co. and Mine and Smelter were called in for consultation. Experience in dealing with this type of problem resulted in recommending installation of a 5' x 10' Marcy Center Peripheral Discharge Rod Mill. This mill was to produce approximately 95% — 10 mesh material from ½ x 3/16 round gravel, which was excess material. The discharge from the Marcy Mill was to be blended with natural material and fines from other crushing operations.

### *No Replacement Parts Required in Two Years*

This Marcy CPD Mill has been in operation approximately two years and has enabled Petrillo Bros. to successfully and economically meet the rigid sand specifications. No replacement parts have been required. The only Marcy Mill operating costs, to date, are for the addition of approximately 2½ grinding rods per week; power, which is low; daily inspection and lubrication.

**This is typical of problems solved by *Marcy experience*... may we help you with yours.**

**NO EXTRA CHARGE FOR MARCY EXPERIENCE**

**THE MINE AND SMELTER SUPPLY CO.**

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For example, cement industry figures for a recent twelve month period show that—of all the nation's cement plants purchasing electrostatic dust collectors—65% selected Western Precipitation equipment... only 35% selected all other makes *combined!*

Faced with unprecedented cement requirements to keep the nation's giant construction operations on schedule as well as provide for the government's new highway program, the cement industry is doing an outstanding job of pacing its expansion program to keep ahead of demands. We of Western Precipitation are proud to be a part of this effort—and are particularly appreciative of the overwhelming preference the industry has shown year after year for Western Precipitation Dust and Fume Control equipment.

**WESTERN PRECIPITATION** is in the forefront of industry advancements...

At Western Precipitation, we regard every challenge as a new opportunity—every industrial advancement as another stepping stone for demonstrating the all-around superiority of our equipment and services. Some recent Western Precipitation equipment FIRSTS in the cement industry include...

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- ✓ COTTRELL Precipitators on the nation's first A-C-L Process!
- ✓ First two-stage COTTRELL Precipitator installation on the new Fuller-Humboldt Preheat system!
- ✓ North America's first installation of selenium rectifiers on COTTRELL Precipitators in a cement plant.
- ✓ Two installations of COTTRELL Precipitators on a new recovery process using sludge from lime processing plants!

Whenever new dust collection problems arise, industry thinks FIRST of Western Precipitation Corporation!

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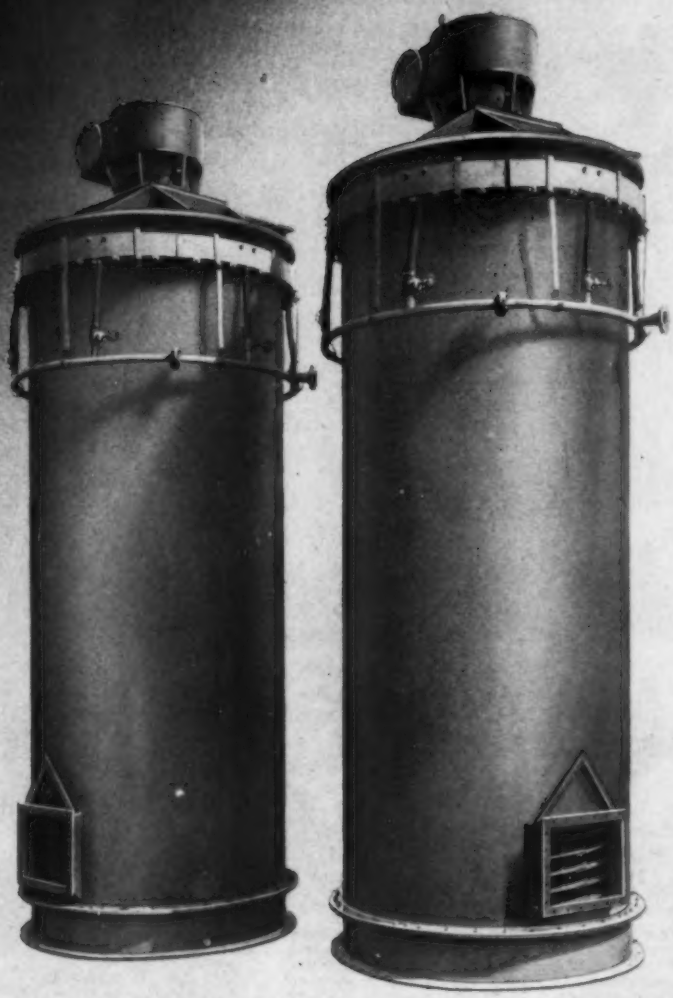
# SMIDTH
## cement coolers



The Smidth Cement Cooler, developed especially for cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging, is externally water-cooled. The hot cement is introduced at the base and conveyed in a thin layer along the cooled interior surface to the top, where it is discharged. High cooling efficiency is assured by the intimate contact of cement and the water-cooled surface.

The Smidth Cooler may also be used with many other similar dry pulverized materials.

*Illustrated here are two 6' 6" dia. x 17' 7" high Smidth Coolers ready for shipment.*

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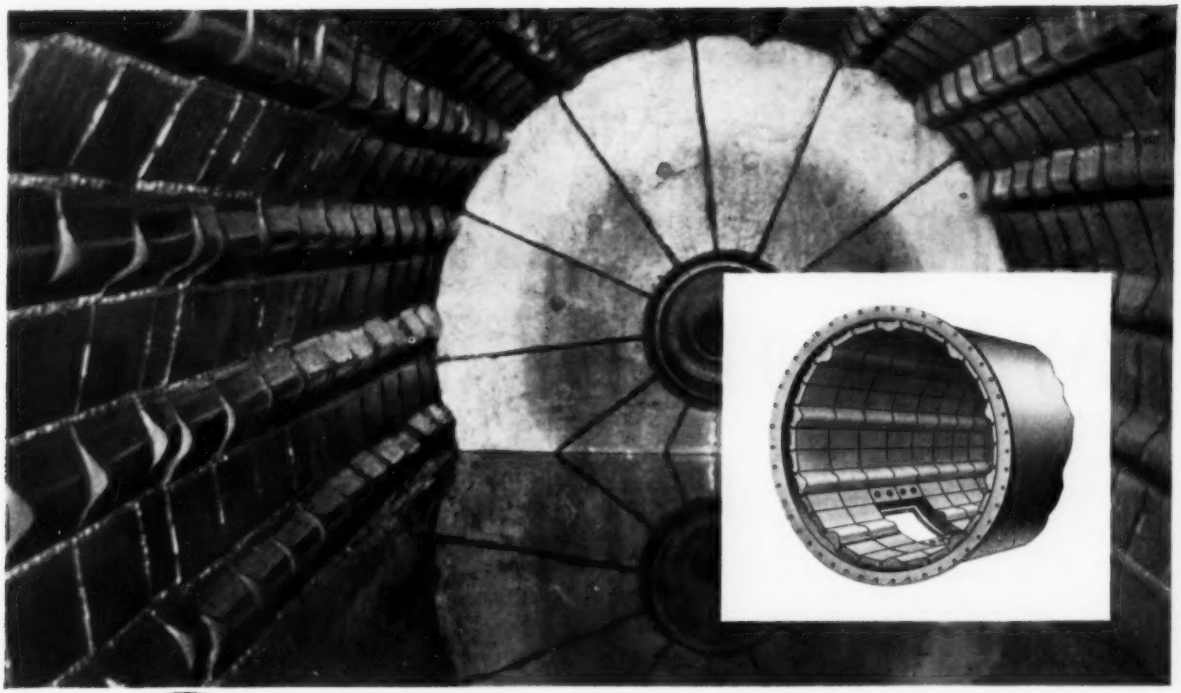

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B&W Tube Mill Liners reduce capital, time and labor costs. Consequently, they reduce the cost of the material ground. Here are eight reasons why:

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6. Reduced Costs in Liner Inventory—standardization is possible because one design fits all diameters of mills. Standardization means quicker unloading and storage.
7. Reduced Costs on Breakage Claims and Delays for Replacements—small castings are rugged and almost impossible to break by handling. Large castings of hard, brittle irons sometimes break in shipment.
8. Reduced Costs in Determining Most Efficient Wear Patterns—you can get wear profiles consisting of all lifter ribs or all flats from the same castings, as well as a combination of both including straight or spiralled lifter pattern.

Liners are supplied in two nominal thicknesses, 1½" and 3" with 1½" high lifters. Castings are 6" wide x 12" long. Positive seating of small castings on mill shell means less breakage of castings under operating conditions. For additional information on B&W Universal Tube Mill Liner Plates write The Babcock & Wilcox Company, Process Equipment, Barberton, Ohio.

S-471

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Will sell with or without power for fraction of new price.

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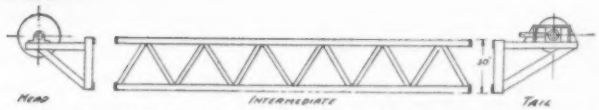
## NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

BONDED®
8" Jr. I Beam Frame Conveyor




Complete Pre-Fab sections of 8" Jr. I Beam or Truss Frame Conveyors, quickly and easily joined together on the job. Both types of conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2 7/16" diam. shaft. Bonded Truss Frame Conveyors are built like a bridge. Designed for long free spans to 50 feet. Constructed of structural angle and reinforced with steel plate. Special high-tensile bolts are used to join all sections. Prices listed are for I Beam Frame Construction. Prices of Truss Frame Conveyors quoted on request. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/16" bottom cover and is fresh stock made by leading manufacturers.

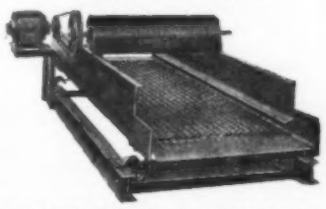
### Conveyor Prices Include Belting

| Belt Width | Length of Conveyor | List Price | Sale Price |
|---|---|---|---|
| 14" | 25' | $1397 | $ 722 |
| 14" | 85' | 3377 | 1733 |
| 16" | 20' | 1262 | 636 |
| 16" | 60' | 2662 | 1359 |
| 18" | 25' | 1477 | 794 |
| 18" | 70' | 3142 | 1648 |
| 18" | 100' | 4252 | 2220 |
| 20" | 25' | 1517 | 828 |
| 20" | 75' | 3467 | 1838 |
| 24" | 25' | 1590 | 898 |
| 24" | 70' | 3480 | 1875 |
| 24" | 120' | 5580 | 2950 |
| 30" | 50' | 2911 | 1617 |
| 30" | 90' | 4831 | 2614 |
| 36" | 25' | 1818 | 1118 |
| 36" | 60' | 3638 | 2096 |
| 16" | 50' | $2222 | $1144 |
| 14" | 125' | 4697 | 2407 |
| 16" | 45' | 2137 | 1038 |
| 16" | 90' | 3712 | 1900 |
| 18" | 45' | 2217 | 1166 |
| 18" | 85' | 3697 | 1933 |
| 18" | 130' | 5362 | 2797 |
| 20" | 60' | 2882 | 1533 |
| 20" | 90' | 4052 | 2145 |
| 24" | 45' | 2430 | 1330 |
| 24" | 100' | 4740 | 2514 |
| 24" | 150' | 6840 | 3603 |
| 30" | 70' | 3871 | 2119 |
| 30" | 140' | 7231 | 3852 |
| 36" | 45' | 2585 | 1678 |
| 36" | 100' | 5718 | 3214 |

For conveyors longer or shorter than those listed above, add or deduct the following per foot prices acording to belt width. Prices include belting.

For 14" belt, add $16.84 per foot;
For 18" belt, add $19.24 per foot;
For 24" belt, add $21.78 per foot;
For 36" belt, add $27.95 per foot.
For 16" belt, add $18.04 per foot;
For 20" belt, add $20.37 per foot;
For 30" belt, and $24.75 per foot;
Write for Bulletins #1138 and #1189.

## NEW BONDED® GENERAL DUTY VIBRATING SCREENS



## NEW BONDED® HEAVY DUTY VIBRATING SCREENS

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

**GENERAL DUTY SCREENS, TYPE AS:** Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for Bull. #1086.
Priced from .....$443.00

**HEAVY DUTY MODELS, TYPE BS:** Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. Write for Bull. #1087.
Priced from .....$1160.00

## NEW BONDED® FEEDERS

For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded Troughing Idler Conveyors, thus eliminating the necessity of two motors. All models available in abrasion resistant alloy steel plate. Capacities to 250 tons per hour. Write for Bull. #1140 & #1182.
Priced from .....$275.00

## NEW BONDED BUCKET ELEVATORS

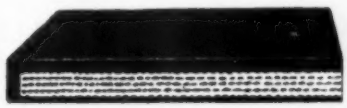
Open or Enclosed, Vertical or Inclined Bucket Elevators with continuous or spaced buckets mounted on chain or belting. Recommended for small to medium size lumps, fine abrasive material such as dry sand, coke breeze, wet slag and many other bulk materials. Because of the wide variety of sizes and types, prices will be quoted on request. Write for Bull. #1047.

## BONDED CONVEYOR ACCESSORIES

| Head & Tail | Wing Pulley | Guide Idler |
|---|---|---|
| $149.00 | $71.00 | $14.50 |

## NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck 1/8" top rubber cover by 1/16" bottom cover 12# to 15# average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



| Width | Ply | List Price | Sale Price |
|---|---|---|---|
| 14" | 4 | $3.82 foot | $2.83 foot |
| 16" | 4 | 3.96 foot | 2.97 foot |
| 18" | 4 | 4.38 foot | 3.29 foot |
| 20" | 4 | 4.83 foot | 3.80 foot |
| 24" | 4 | 5.68 foot | 4.26 foot |
| 30" | 4 | 6.97 foot | 5.21 foot |
| 36" | 4 | 8.26 foot | 6.18 foot |

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/8" top rubber cover x 1/16" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. This belt is for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

| Width | Ply | List Price | Sale Price |
|---|---|---|---|
| 16" | 4 | $4.71 foot | $3.46 foot |
| 18" | 4 | 5.23 foot | 3.83 foot |
| 20" | 4 | 5.73 foot | 4.37 foot |
| 24" | 4 | 6.74 foot | 4.94 foot |
| 30" | 4 | 8.26 foot | 5.07 foot |
| 24" | 5 | 7.90 foot | 5.78 foot |

The following belts are 5-ply, 32 oz. duck:

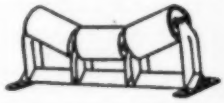
| Width | Top Cover | Bottom Cover | List Price | Sale Price |
|---|---|---|---|---|
| 24" | 1/8" | 1/16" | $ 8.56 Ft. | $ 6.42 Ft. |
| 30" | 1/8" | 1/16" | 10.52 Ft. | 7.89 Ft. |
| 36" | 1/8" | 1/16" | 14.21 Ft. | 10.66 Ft. |

A heavier duty 28 oz. duck belt with 1/8" top rubber cover x 1/16" bottom rubber cover having 3500# to 4000# average cover tensile, 20# to 24# average friction pull, or the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

| Width | Ply | List Price | Sale Price |
|---|---|---|---|
| 18" | 4 | $5.67 foot | $4.20 foot |
| 20" | 4 | 6.32 foot | 4.61 foot |
| 24" | 4 | 7.32 foot | 5.41 foot |
| 24" | 5 | 8.53 foot | 6.31 foot |

Other widths, plies, duck weights and cover thicknesses available at low prices. Write for Free Sample.

## NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:

| | | | |
|---|---|---|---|
| 14" belt | $18.50 | 24" belt | $21.25 |
| 16" belt | 19.25 | 30" belt | 22.00 |
| 18" belt | 20.50 | 36" belt | 22.75 |
| 20" belt | 20.75 | 48" belt | 25.50 |

1-roll, 5" diameter Return Idlers for:

| | | | |
|---|---|---|---|
| 14" belt | $7.25 | 24" belt | $ 8.50 |
| 16" belt | 7.50 | 30" belt | 9.50 |
| 18" belt | 8.00 | 36" belt | 10.00 |
| 20" belt | 8.25 | 48" belt | 11.50 |

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable prelubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers priced from $61.00. Write For Bulletin #1138.

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7400 Marion Dragline, 160′, 13 yard
625 Page Diesel Drag, 150′, 10 yard
4500 Manitowoc Drag, 120′, 5 yard
621-S Page Diesel, 135′ 6 yard
7-W Monighan Elec. Drag, 120′, 7 yd.
618 Page Diesel Drag, 120′, 5 yd.
5-W Bucyrus Monighan Drag, 120′, 5 yd.
2400 Lima Dragline, 130′, 5 yd.
111-M Marion Diesel Drag, 100′, 4 yd.
1055 P&H Dragline, 80′, 3½ yd.
1201 Lima Dragline, 85′, 3 yd.
1201 Lima Comb. Shovel & Crane
955 P&H Dragline, 90′, 2½ yd.
54-B Bucyrus Erie Drag, 85′, 2½ yd.
3500 Manitowoc Drag, 85′, 2½ yd.
40-A Marion Drag, 90′, 2½ yd.
2000-B Manitowoc Cranes
604 & 802 Lima Cranes
151-M Marion Elec. 5 yd. Shovel
4500 Manitowoc 5 yd. H.L. Shovel
1601 Lima 4 yd. Standard Shovel
120-B Bucyrus Erie 4 yd. Electric Shovel
1201 Lima Standard 3½ yd. Shovel
1055 P&H 3½ yd. Standard Shovel
1201 Lima 2½ yd. H. L. Shovel
955 P&H 2½ yd. Standard Shovel
802 Lima Comb. H. L. Shovel & Drag
54-B Bucyrus Erie 2½ yard H.L. Shovel
51-B Bucyrus Erie 2 yd. Shovel
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488 Bucyrus Erie Shovel 2 cy Diesel
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1—Motor, electric, 40 H.P. Allis Chalmers, 865 R.P.M., 3 phase, 60 cycle, 440 volt, slip ring open type.
2—Locomotives, 8 and 12 ton, 36″ gauge Plymouth.
1—Bucket, 1¼ yard capacity for Lull Shovel Loader.
1—Screen 3′x10′ single deck, Allis-Chalmers low head.

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Bucyrus-Erie Draglines, 2½ yd. to 8 yd.
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Manitowoc Draglines, 2½ yd. to 5 yd.
Manitowoc Shovels, 2½ yd. to 5 yd.
Marion Shovels & Drags, 4 yd. to 9 yd.
Lima Shovels & Drags, 1½ yd. to 6 yd.
Osgood Shovels & Drags, 1½ yd. to 2½ yd.
Caterpillar Graders & Dozers.
Hi-Lift Shovels.
P&H Truck Crane.
2400 Lima Shovel front attachment.
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6″ and 9″ Drills, Diesel and Electric.

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**COMPRESSORS:** 2—Sullivan WN-20"x12" x14", 400 H.P., 2200 volt, complete on foundation with all auxiliary equipment. Bargain prices.
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**GYRATORY & REDUCTION CRUSHERS:** All sizes.
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1—40x42 Power & Mining Superior Jaw Crusher — equipped with rope —(texrope) drive.

1—125 horsepower Westinghouse motor (slip ring) with controller & grids.

1 #6 Style K—Allis Chalmers Gyratory Crusher with 50 horse power G.E. motor and texrope drive.

1 30" Stedman Disintegrator impact crusher with 50 horse power G.E. motor and texrope drive.

*This equipment is offered subject to prior sale.*

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**DIESEL GENERATOR**
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International UD-9 Engine.
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Self-propelled, diesel powered Schramm Rotadrill — factory demonstrator, barely broken in.
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Drills 6¼" hole to depth of 700'—deeper penetration at smaller diameters. Ideal for quarry work.

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Schramm, Inc. Dept. PQ, West Chester, Pa.

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Wanted: 8 or 10" Dredge, preferrably on pontoons with Swintex or Cutter head and screening plant on barge. Must be priced right. What have you?

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42" x 48" or 44" x 48" Late Model Roller Bearing Jaw Crusher. Also 42" x 48" Manganese Feeder. Give particulars including price, location and condition.

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3—Patterson 6' x 8' Unlined Ball Mills.
1—International 6' x 7' Porcelain-lined Pebble Mill 30 HP motor.
1—Dixie #3620 Non-Clog Hammer Mill.
2—Stedman 40" dia. Six Cage Disintegrators, two 40 HP motors.
1—Kennedy Van Saun 4'6" x 6' Airswept Tube Mill.
1—Williams Slugger Hammer Mill 30 HP. motor.
1—Allis Chalmers 24" x 12" Jaw Crusher.
1—Allis Chalmers 36" x 16" Crushing Rolls.
3—Jeffrey 20" x 12", 15" x 8" Hammer Mills.

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950 feet 9", 10", 12", 14" Screw Conveyor with drives.
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1—Steel Rectangular Bin 14' x 14' x 35' high with 7' cone.
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3—Fuller Rotary, Type C-70, 340 CFM, 25 HP motors.
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HARDINGE MILLS—4'6"x16", 6'x14", 6'x22", 6'x36", 7'x22", 8'x36", 8'x48", 10'x48".
ROD MILLS—3'x10', 4'x8', 4'x9', 4'x14', 5'x8', 5'x10', 5'x14', 6'6"x14'6".
TUBE MILLS—5'x14', 5'x22', 5'6"x22', 6'6"x21'.
COMPEB MILL 7'x24'.

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CEDAR-RAPIDS—5360H DOUBLE IMPELLER IMPACT BREAKER, 3030 DOUBLE IMPELLER IMPACT BREAKER.
WILLIAMS—GA-60 - 44"x60" FEED OPENING.

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54"x10'3"—54"x16'—3'x12'.

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DORR BOWL RAKE—3'x24'x12', 5'x30'x26', 16'x24'x28'.
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17 THICKENERS—100', 80', 36', 24', 16' & 12'.
20"x15 EAGLE SINGLE SCREW COARSE MATERIAL WASHER.

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KILNS—6'x28', 6'x7'x80', 7'x110', 8'x125'.

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BLAKE TYPE—66"x84", 56"x72", 36"x48", 36"x42", 30"x36", 24"x36", 18"x36", 16"x32".
SINGLE SHAFT—20"x36", 18"x36", 10"x24".
CAM & ROLLER—24"x40", 16"x32", 14"x26", 11"x26", 10"x20", 6"x20".

### GYRATORY FINE REDUCTION CRUSHERS

SYMONS—3', 4', and 20".
KENNEDY—19S, 25S, 37S.
SUP. McC.—6", 10", 18".
TRAYLOR—3' TYPE TZ.

### GYRATORY PRIMARY CRUSHERS

6", 10", 14", 16", 26" & 36" SUP. McC.—Gates AL. CHAL. 3, 4, 5, 6, 7½, 8, 9, 12K.

### 15x24 PORTABLE CRUSHER

Model 15 A Diamond Crushing Plant, 15x24 Jaw Crusher, 30'x8' Apron Feeder, Hopper 24" x 26' Conveyor, Gasoline Engine on Pneumatic Tires.

### 2A CEDAR RAPIDS CRUSHER

24x16 Rolls—3'x8' Screen on Wheels with 1 belt conveyors & Gas Engine.

### STEEL SHEET PILING

1500 TON MZ 32, DP2, AP3, 30' & 60'.

### STEEL DERRICKS

GUY: 3 TON 85 FT. BOOM, 25 TON 60 FT. BOOM, 15 TON 100 FT. BOOM, 29 TON 115 FT. BOOM, 50 TON 100 FT. BOOM.
STIFF LEG: 5 TON 70 FT. BOOM, 15 TON, 100 FT. BOOM, 25 TON 100 FT. BOOM, 75 TON 135 FT. BOOM. 1—5 TON 100 FT. BOOM.

### RAILWAY CARS

177—DUMP STD. GA.—20, 16, 12, 6 & 4 YD.
36—FLATS—10 TON, 40 TON, 50 TON CAP.
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Lorain 79 1½-yd. diesel shovel.
P & H 655B 1½-yd. diesel dragline.
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Lorain L50K-6 1¼-yard diesel crane-hoe.
Lorain L-50K 1-yd. diesel shovel.
General ¾-yard gas crane-shovel-hoe.
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Lorain L-26 ¾-yard diesel powered clamshell.
Link Belt LS-85 ¾-yard diesel shovel-drag.
Lima 34 Paymaster ¾-yard diesel shovel.
Lorain L-40 ¾-yard diesel clam-drag-shovel.
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1—Adams diesel powered grader.

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Lorain 50, 1-yd., 21′ boom, 17 ′stick.
Lorain 40, ¾-yd., 19′ boom, 16′ stick.
Lorain 30A, ½-yd., 16′ boom, 13′4″ stick.
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Lima Type 1201 dragline equipped with an 85-ft. boom, dredging channel into Biscayne Bay at Ojus, Fla. Approximately 250,000 cu. yds. of sand and coral rock will be moved to complete this job.

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*See also Detailed Information in 1957 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK

## WIRE ROPE AT WORK

The Coaldale Mining Co., Coaldale, Pa., operates one of the region's best anthracite mines. The photograph above shows the headframe of No. 7 Shaft, with its four big bicycle sheaves and its sturdy steel ropes. Up the production compartments come heavy loads of coal, which are taken by rail to the rotary dump, then hauled up a plane to the breaker. No. 7 Shaft, now approximately 1100 ft deep, will handle some 3400 tons of coal and rock in an average day.

The capacity of the shaft cars is 4.9 tons. Lifting these loads is a job entrusted to Bethlehem wire rope, which is always specified in the Purple Strand grade. To insure the necessary combination of strength and fatigue-resistance, the ropes are supplied in the 1⅛-in. size with the popular 6 x 25 Type W construction.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

*Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:*

MINING • QUARRYING • CONSTRUCTION • EXCAVATING • PETROLEUM • LOGGING • MANUFACTURING

# B.F.Goodrich report:

# Now rocks can climb longer, steeper hills on rubber

*B. F. Goodrich improvements in rubber brought extra savings*

***Problem:*** To speed up quarrying operation, this company wanted to move their primary crusher down to the quarry floor. But then they would need a fast, inexpensive way to get the highly abrasive rock out of the quarry.

They looked for a conveyor belt that could stand the weight and continuous cutting of sharp rock.

***What was done:*** B.F.Goodrich engineers recommended a rubber conveyor belt made with B.F.Goodrich Nyfil fabrics. In this belt, nylon is used as cross threads in the fabric to give extra strength without adding weight. Use of nylon increases flexibility, so belt troughs perfectly whether empty, lightly or fully loaded. Belts made with Nyfil fabrics hold fasteners better, have greater impact resistance, can carry heavier loads farther, higher, than belts made with all-cotton fabrics. Yet these longer-lasting belts cost no more.

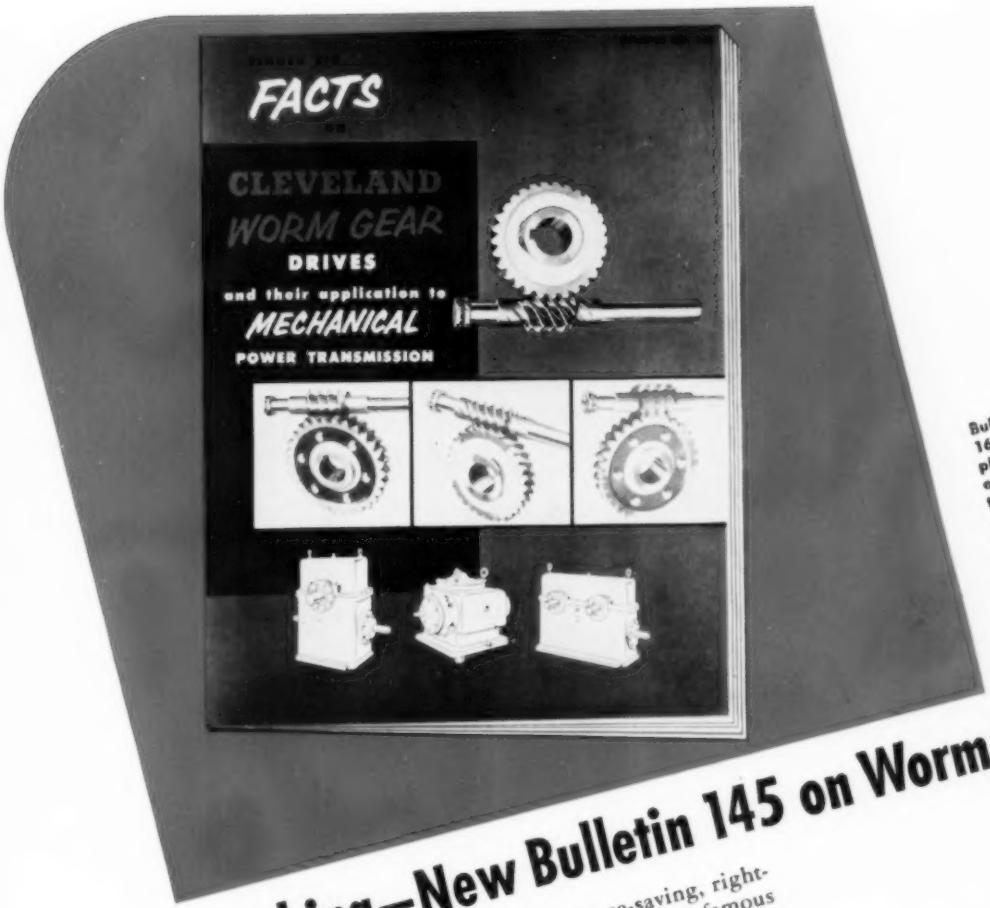
***Savings:*** The B.F.Goodrich Nyfil belt shown here carries 700 tons of rock an hour. After 18 months of use it shows no sign of wear and is still going strong.

***Extra benefits:*** High-tension Nyfil fabrics make it possible to engineer longer center and high lift conveyors in a single flight. This means lower installation costs, lower power costs, higher operating efficiency and lower maintenance costs.

***Where to buy:*** Your B.F.Goodrich distributor has full information on the conveyor belt described here. And, as a factory-trained specialist in rubber products, he can answer your questions about all the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-126, Akron 18, Ohio.*

**B.F.Goodrich**

**INDUSTRIAL PRODUCTS**




Bulletin 145 gives you 16 fact-filled pages of photographs and data on standard and custom-designed worm gear speed reducers and worm gearing components for built-in drives.

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WHENEVER you want a safe, space-saving, right-angle drive, you specify Cleveland. This famous worm-gear drive transmits power uniformly, smoothly, dependably, under even the most severe operating conditions, for a lifetime of trouble-free service. Clevelands actually improve with use. Thousands of units outlast their driven machines.

To know what Cleveland best meets any need—for speed reducer or worm-gear set—standard or special—write for new Bulletin 145. Just off press, it will bring your file up to date on this ever more popular drive. The Cleveland Worm & Gear Company, 3280 E. 80th St., Cleveland 4, O.

*Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.*

# QUIZ

## For Multiwall Bag Buyers

*"How Does Your Packaging Operation Rate?"*

1 Is your bag correctly sized for your product?
2 Is your bag properly constructed for your product?
3 If loss of product is caused by deterioration, would special protective sheets help to reduce such loss?
4 Is the total cost of your bag out of proportion to the selling price of your product?
5 Does your product cost warrant redesigning your bag to merchandise your product more effectively?
6 Are you using the most economical filling machine available for packaging?
7 Are your current suppliers giving you the service you desire?
8 Are your suppliers integrated and capable of maintaining dependable service at all times, under all conditions?
9 Are your suppliers' representatives qualified to help you with your packaging, sales promotion and marketing?

Perhaps we may be able to help you to arrive at the right answers in order to achieve higher production at lower costs.

**KRAFT BAG CORPORATION**

*Gilman Paper Company Subsidiary*

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**Daily News Bldg., Chicago 6, Ill.**

*Plants at St. Marys, Ga. and Gilman, Vt.*

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Gilman PAPER CO.
- St. Marys Kraft Corp.
- Gummed Tape Div.
- The Gilmanized Corp.
- Kraft Bag Corp.

☐ O.K. Kraft... Help me to answer your Quiz. Please have representative call. PQ

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CITY_____

PRODUCT MFD_____ NAME_____

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